Service Manual

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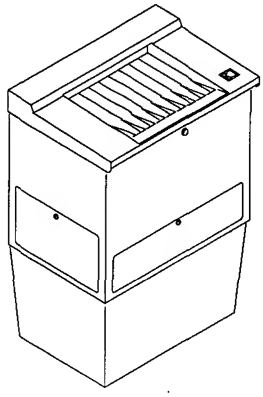

KODAK *RP X-OMAT* Processor Model M7B

HEALTH SCIENCES

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SECTION 1 SPECIFICATIONS

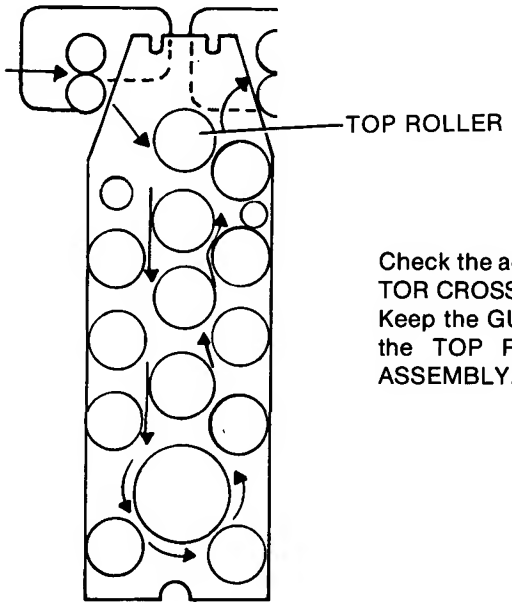
See Section 4 for all specifications.

SECTION 2 SERVICING PROCEDURES

ADJUSTMENTS

DETECTOR CROSSOVER ASSEMBLY

GUIDE SHOE



NOTE

Check the adjustment when you install the DETECTOR CROSSOVER ASSEMBLY in the PROCESSOR. Keep the GUIDE SHOE ASSEMBLY from touching the TOP ROLLER in the DEVELOPER RACK ASSEMBLY.

FIGURE 2-1

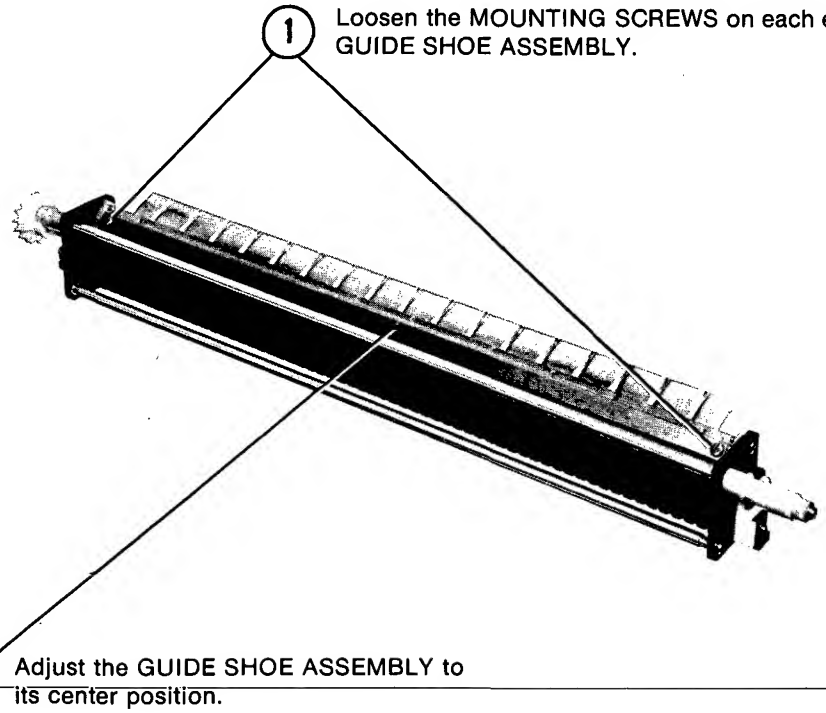

1
Loosen the MOUNTING SCREWS on each end of the GUIDE SHOE ASSEMBLY.
2
Adjust the GUIDE SHOE ASSEMBLY to its center position.

FIGURE 2-2

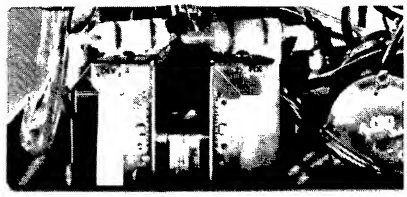
DETECTOR CROSSOVER ASSEMBLY

Adjustment of the SWITCHES

Use the following steps to check each DETECTOR SWITCH:

1. Connect the main power. The REPLENISHER PUMP does not operate.

2. Feed a 13 x 18 cm (5 x 7-inch) film on the idle side of the PROCESSOR. The REPLENISHER PUMP operates while the film is between the DETECTOR ROLLERS. Do this procedure again for the other side.



REPLENISHER PUMP

NOTE

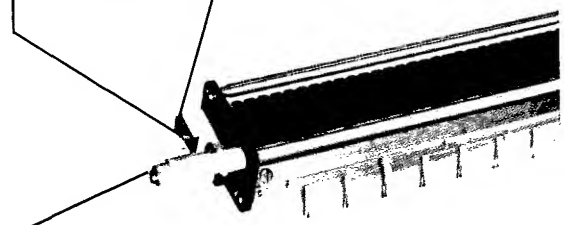
To adjust the switch on the idle side, disconnect the CONNECTOR from the drive side of the CROSS-OVER ASSEMBLY.

To adjust the SWITCH on the drive side, disconnect the CONNECTOR from the idle side of the CROSS-OVER ASSEMBLY.

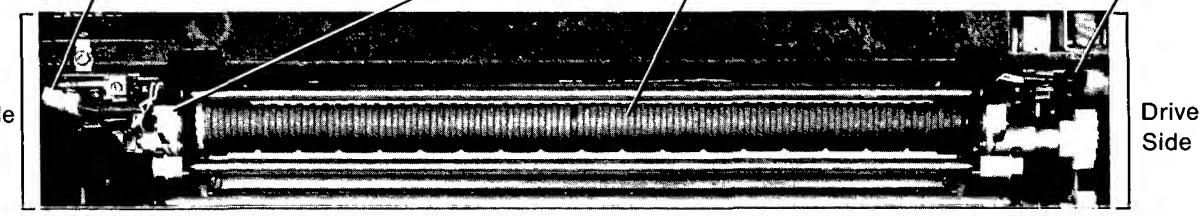
3. Clearance from the MAGNET to the SWITCH has to be 1.6-3.2 mm (1/16-1/8 inch). If adjustment is necessary, do the following:

3a. Loosen the SCREW.

3b. Move the MAGNET.



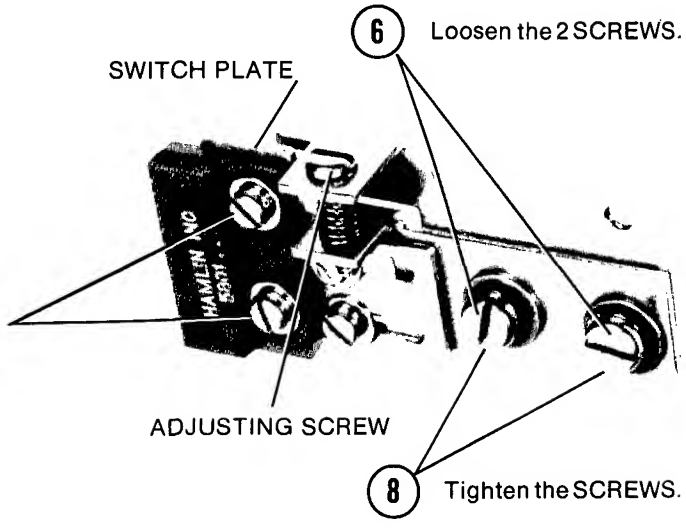
3c. Tighten the SCREW.



4. Align the MAGNET with the SWITCH. If adjustment is necessary:

   a. Loosen the SCREWS.
   b. Move the SWITCH PLATE.
   c. Tighten the SCREWS.

5. Loosen the 2 SCREWS. Move the SWITCH down until the PUMPS operate. Tighten the 2 SCREWS.



9. Do Step 2 again.

10. Do the procedure again for the other SWITCH if necessary.

7. Move the SWITCH up by rotating the ADJUSTING SCREW clockwise until the REPLENISHER PUMP stops. Turn the ADJUSTING SCREW an additional 1/2 rotation.

FIGURE 2-3

TURNAROUND ASSEMBLIES

GUIDE SHOES

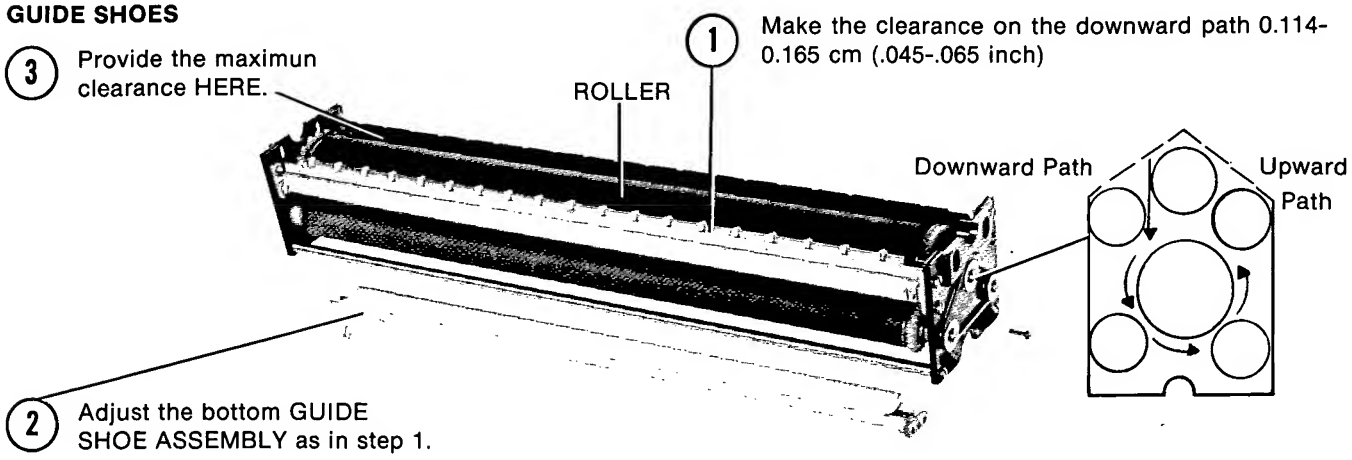

3 Provide the maximun clearance HERE.
1 Make the clearance on the downward path 0.114-0.165 cm (.045-.065 inch)
ROLLER
Downward Path
Upward Path
2 Adjust the bottom GUIDE SHOE ASSEMBLY as in step 1.

FIGURE 2-4

MAIN DRIVE CHAIN

WARNING

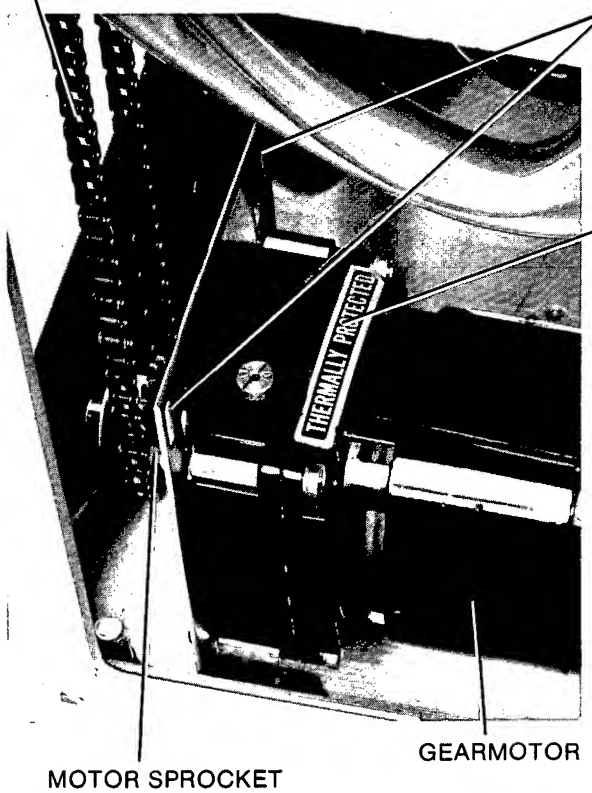
Dangerous Voltage

1. Disconnect the main power.
2. Loosen the 4 MOUNTING SCREWS.

NOTE

Check to see that the CHAIN does not touch other parts when operating.

3. Move the GEARMOTOR. Stop when the DRIVE CHAIN is tight. Tighten the CHAIN and the four MOUNTING SCREWS.
4. Check the alignment of the MOTOR SPROCKET with the MAIN DRIVE SPROCKET on the MAIN DRIVE SHAFT.
5. Lubricate the DRIVE CHAIN.



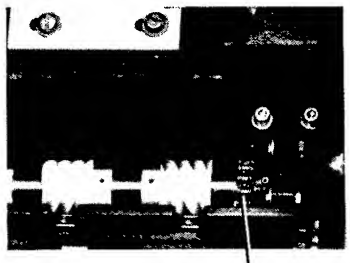
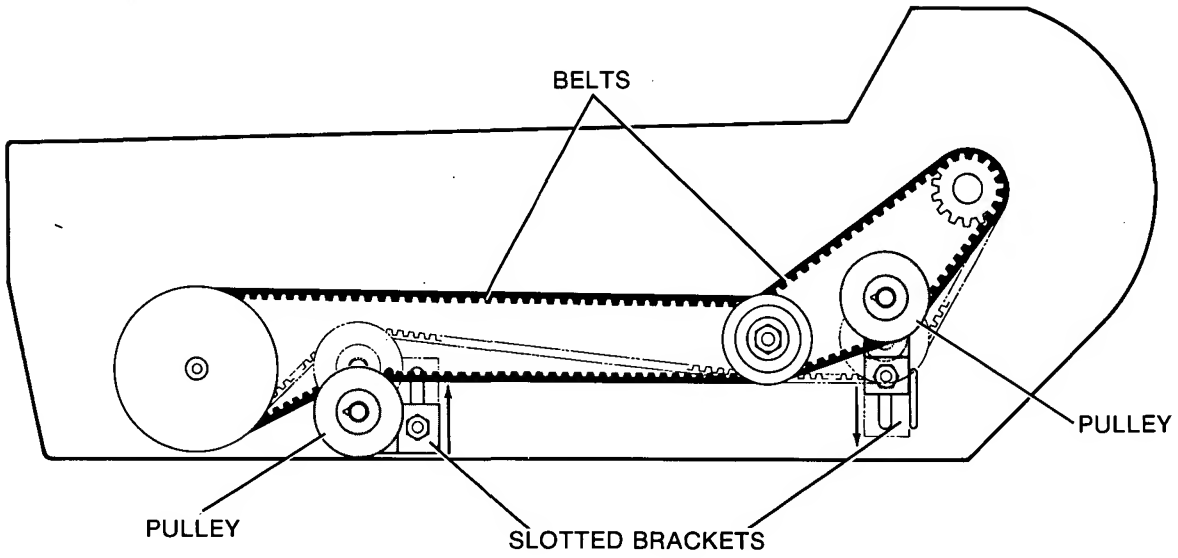


FIGURE 2-5



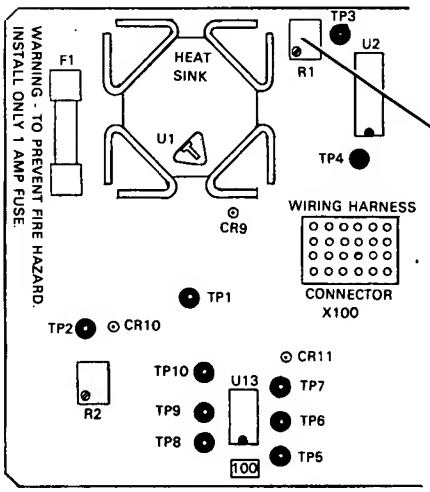
1. Move the PULLEYS up or down in the SLOTTED BRACKETS to loosen or tighten the BELTS.

FIGURE 2-6

"CLEAR TIME"

WARNING

Dangerous Voltage



100 CIRCUIT BOARD

CAUTION

To prevent damage to the 100 CIRCUIT BOARD, use an insulated screwdriver.

To adjust the clear time from 3 to 4 minutes, adjust POTENTIOMETER R1.

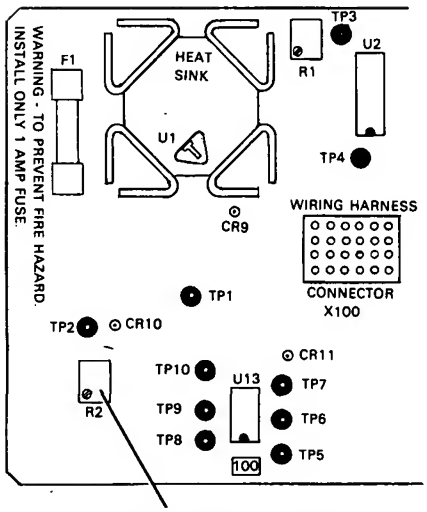
decreases *time* ← → increases *time*

FIGURE 2-7

Developer Temperature

WARNING

Dangerous Voltage



CAUTION

To prevent damage to the 100 CIRCUIT BOARD, use an insulated screwdriver.

To adjust the temperature of the developer, adjust POTENTIOMETER R2.

decreases temperature ← → increases temperature

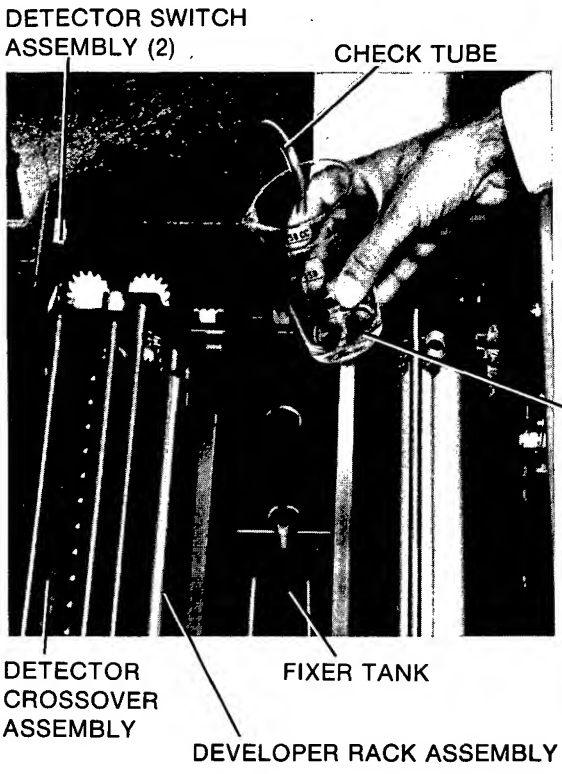
(A) IMPORTANT

The DEVELOPER RECIRCULATION SYSTEM will not operate with water unless it has sufficient electrolytic properties to conduct a small current. Water may or may not be a conductor depending on the mineral content. If necessary, add 1 cup of developer to the water to achieve proper operation.

FIGURE 2-8

(R) Checking the Replenishment Rates

1. Remove the DETECTOR CROSSOVER ASSEMBLY and the DEVELOPER RACK ASSEMBLY.



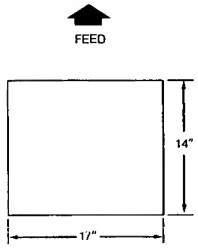
2. Insert the CHECK TUBE into the hole in the TANK. Do the DEVELOPER TANK first.

3. Install the DETECTOR CROSSOVER ASSEMBLY.

4. Actuate the DETECTOR ASSEMBLY. Allow the solution to flow into the CHECK TUBE, releasing the air.

5. Release the DETECTOR SWITCH ASSEMBLY.

6. To measure the replenishment rate,* hold a graduate under the CHECK TUBE; actuate the DETECTOR ASSEMBLY for 20 seconds or feed a 14 x 17-inch film.



NOTE

The solution flows for 4 seconds after the trailing edge of the film leaves the DETECTOR ROLLERS.

7. Repeat Step 6 to check the flow rate again before making any necessary adjustments.

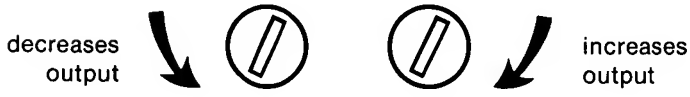
8. Clean the CHECK TUBE before you insert it into the FIXER TANK.

*See the manufacturer's recommendations for the correct flow rates.

FIGURE 2-9

Adjusting the Replenishment Rates

Rotate the ADJUSTING SCREW:



CAUTION

Do not adjust the LOCKNUT on the other end of the ADJUSTING SCREW.

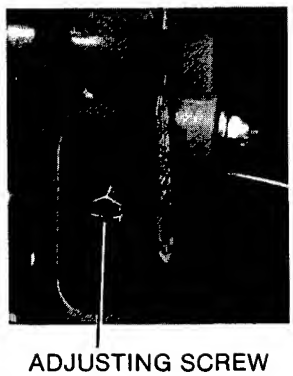
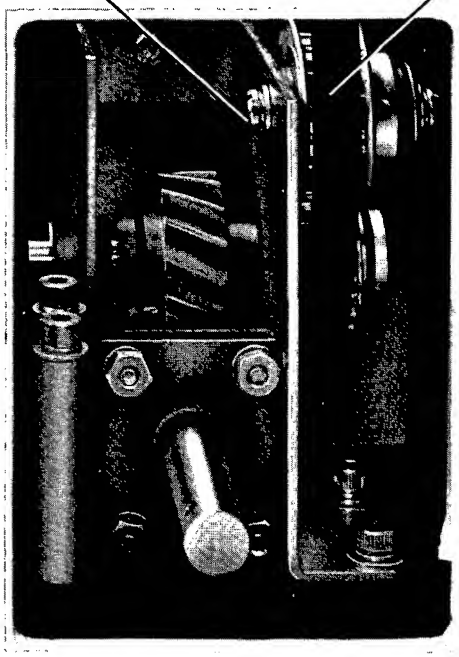


FIGURE 2-10

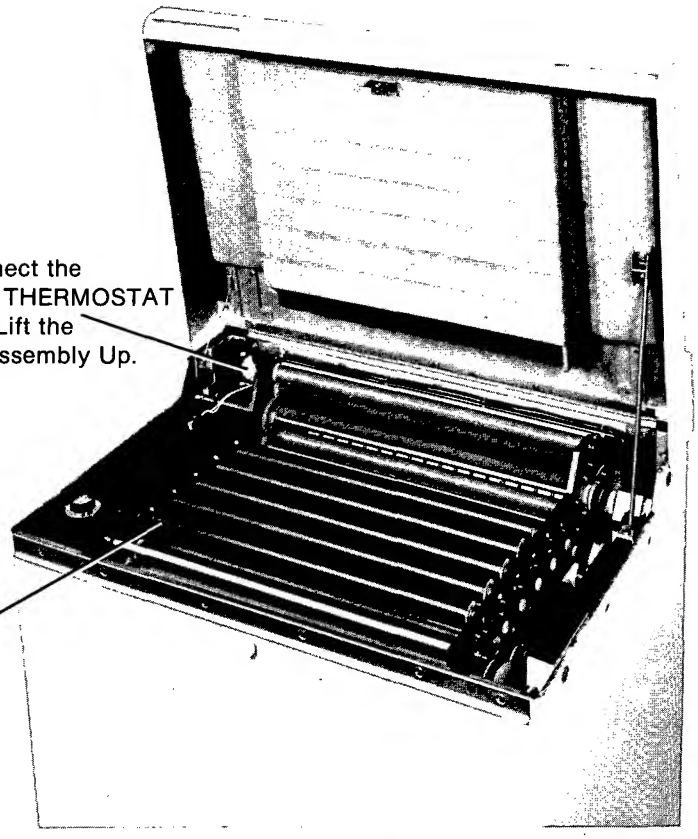
REPLACEMENTS

DRYER ASSEMBLY

1. Loosen the SCREW and remove the IDLER PULLEY.
2. Remove the DRYER DRIVE BELT from the bottom PULLEY.



3. Disconnect the DRYER THERMOSTAT PLUG. Lift the Dryer Assembly Up.

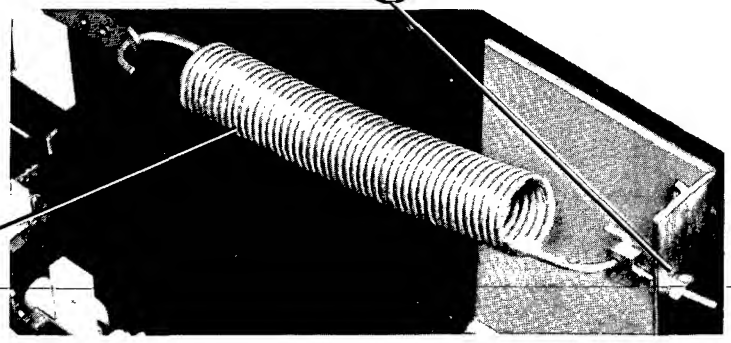


6. Remove the DRYER ASSEMBLY from the PROCESSOR.

CAUTION

Manually hold the DRYER ASSEMBLY up before you do Step 4.

4. Remove the NUT.



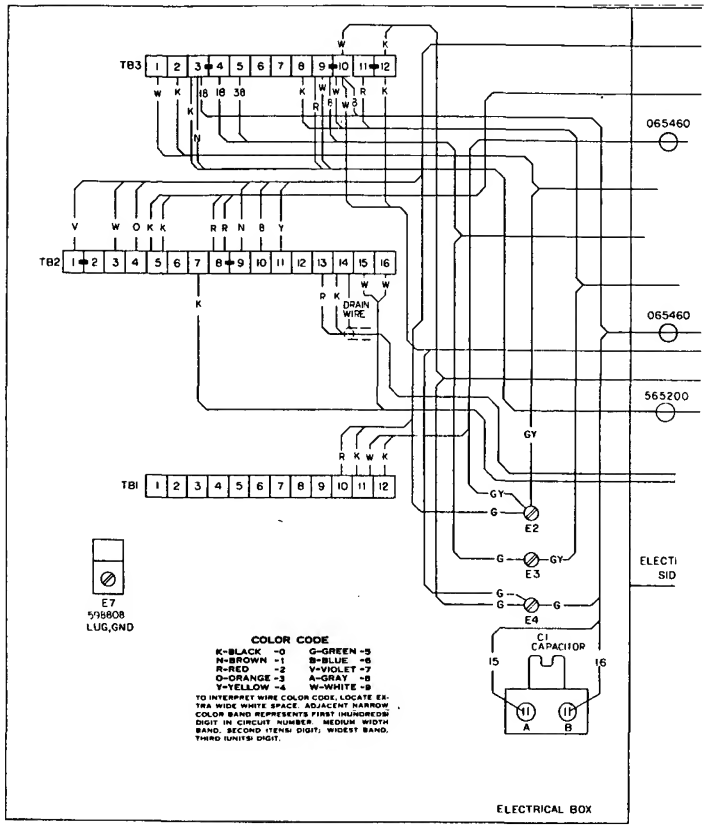
5. Remove the DRYER COUNTER-BALANCE SPRING. Check the position of the SPRING in the hole.

FIGURE 2-11

DRYER BLOWER ASSEMBLY

WARNING

Dangerous Voltage



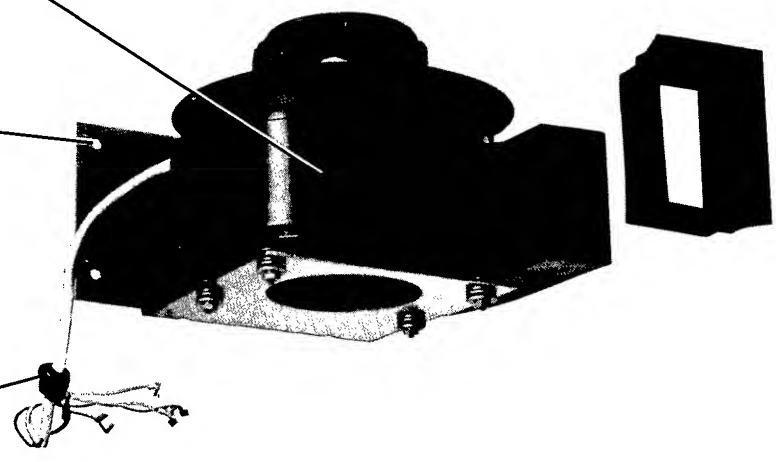
1. Disconnect the main power.

2. Disconnect the wires to external CAPACITOR C1.

3. Disconnect the wires from the DRYER BLOWER ASSEMBLY at TB3-3 and TB-9 or 10.

6. Remove the DRYER BLOWER ASSEMBLY.

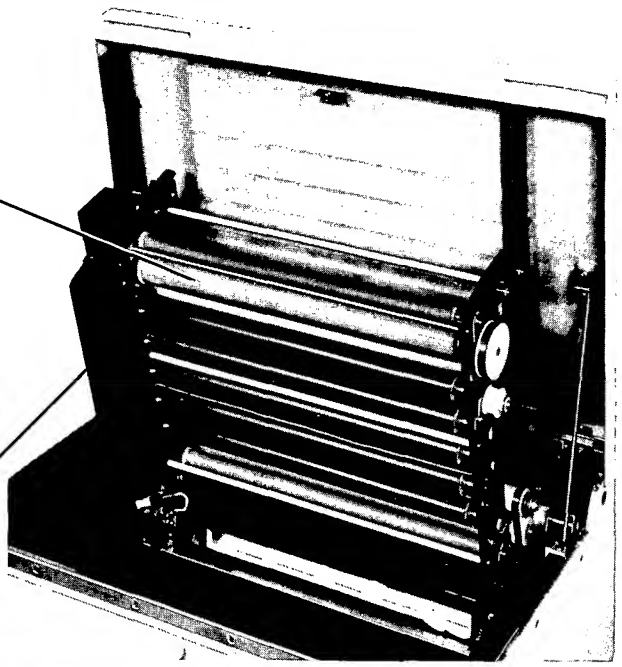
5. Remove the 3 BRACKET MOUNTING SCREWS.



4. Disconnect the STRAIN RELIEF.

FIGURE 2-12

(1) Lift the DRYER ASSEMBLY up.



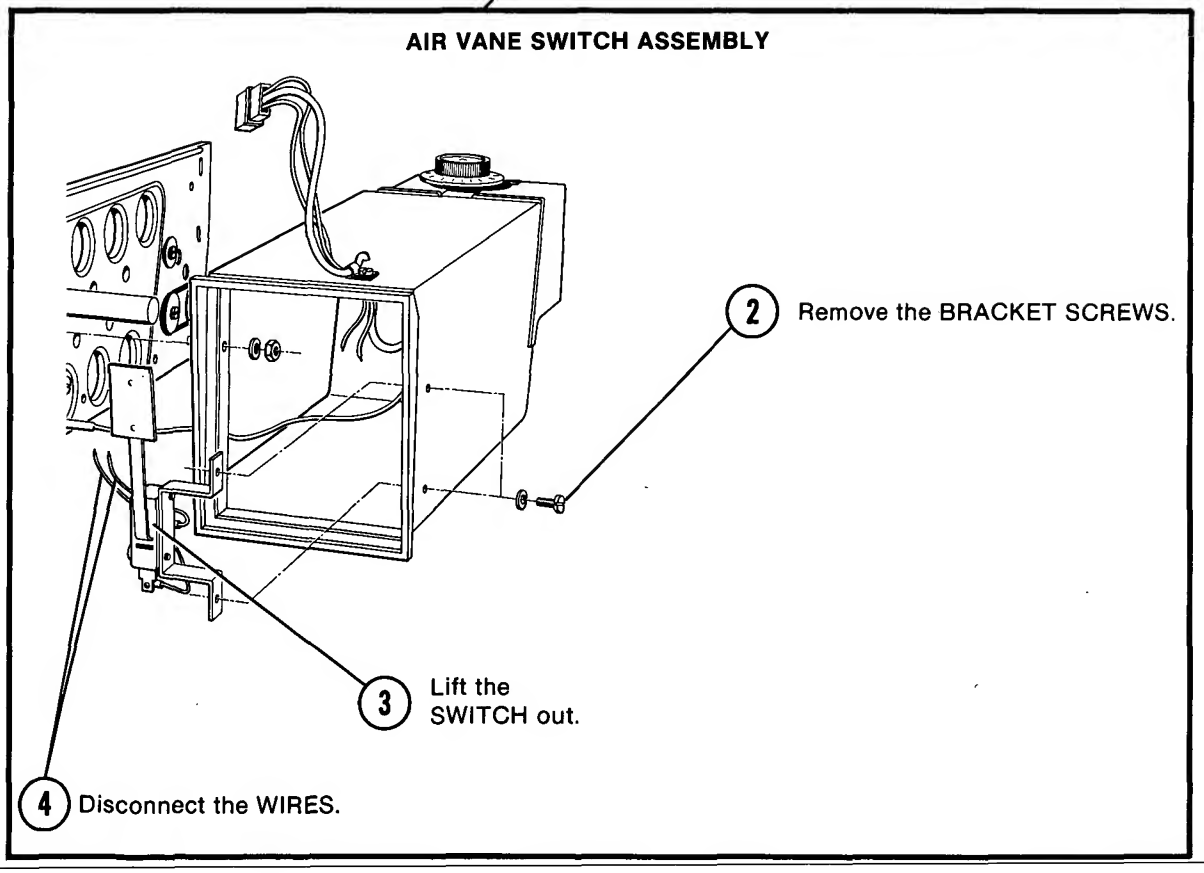


FIGURE 2-13

DETECTOR CROSSOVER ASSEMBLY
DETECTOR SWITCH ASSEMBLIES (2)

WARNING

Dangerous Voltage

1. **Disconnect the main power.**
2. Remove the following parts:
   SCREWS
   LOCK WASHERS and
   WASHERS
3. Disconnect the CONNECTOR.

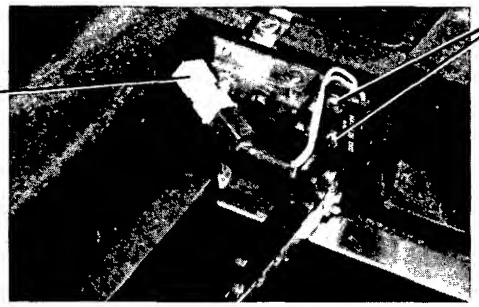


FIGURE 2-14

GUIDE SHOE

The longer TIPS have to be in the direction that the film moves.

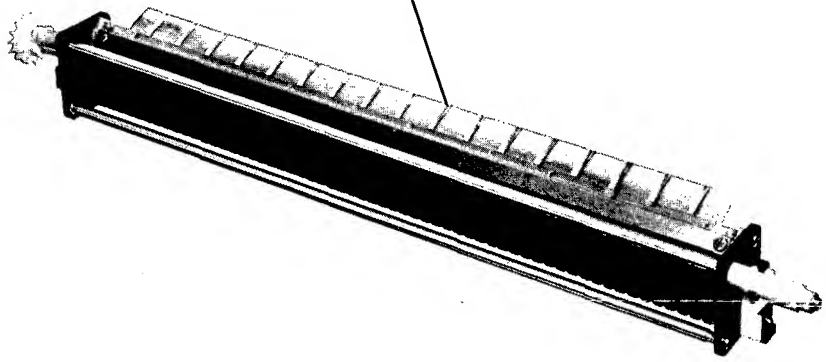


FIGURE 2-15

DETECTOR CROSSOVER

Remove the following parts:

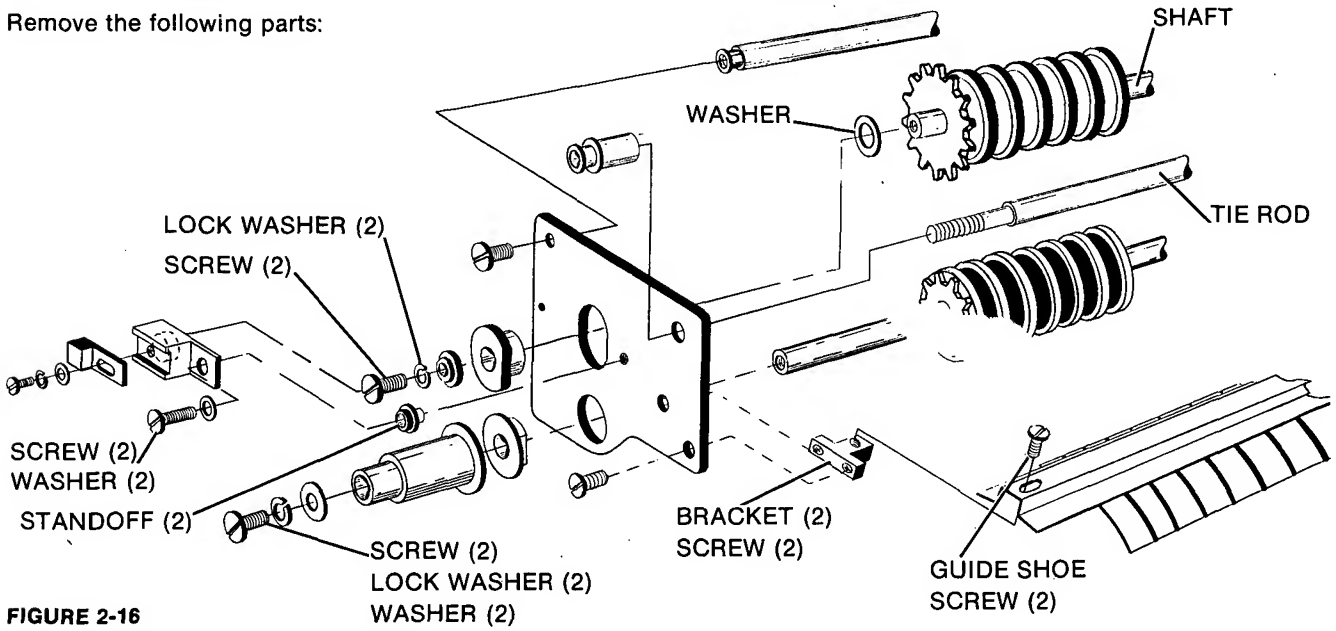
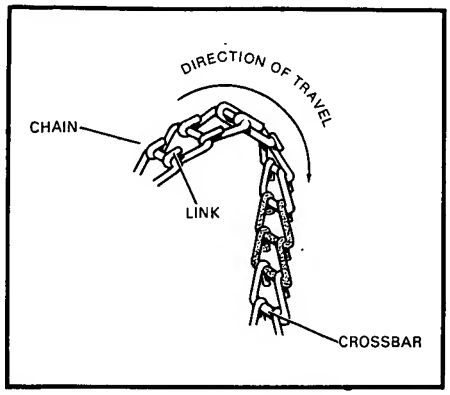


FIGURE 2-16

RACK ASSEMBLIES

RACK CHAINS



The CROSSBAR of each LINK must be in the direction of film travel. The splicing LINK must be the same as the other LINKS.

FIGURE 2-17

1. Remove the TOP ROLLER and the SHAFT.
2. Hold the CHAIN by inserting a PIN PUNCH between the 2 LINKS.
3. Open the LINKS with a SMALL-BLADE SCREWDRIVER or PLIERS.
4. Connect the end of the new CHAIN to the old CHAIN, and pull it through the RACK ASSEMBLY.

CAUTION

Check that the new CHAIN is the same length as the existing CHAIN.

5. Close the CHAIN LINK.

RESILIENT ROLLER

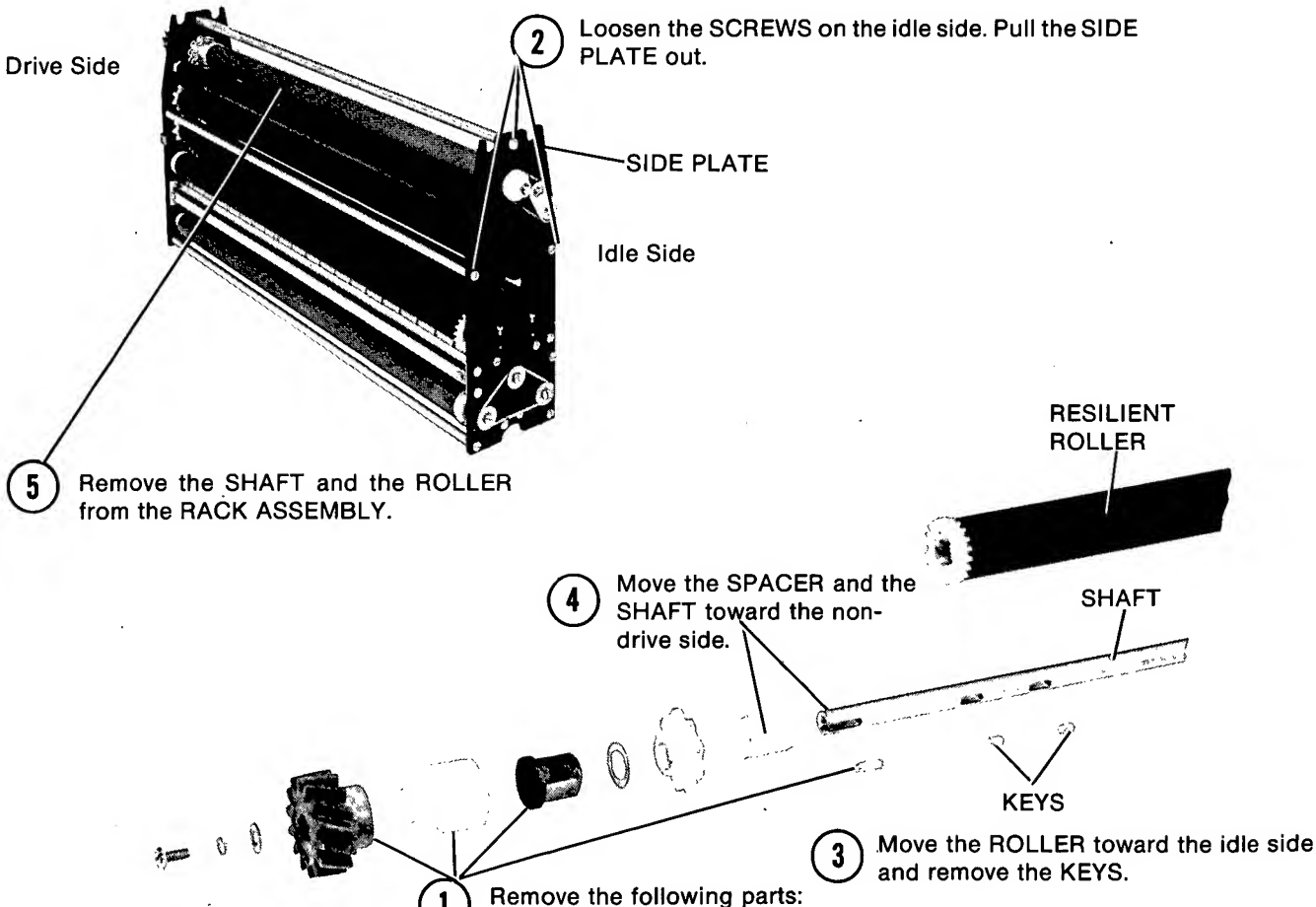
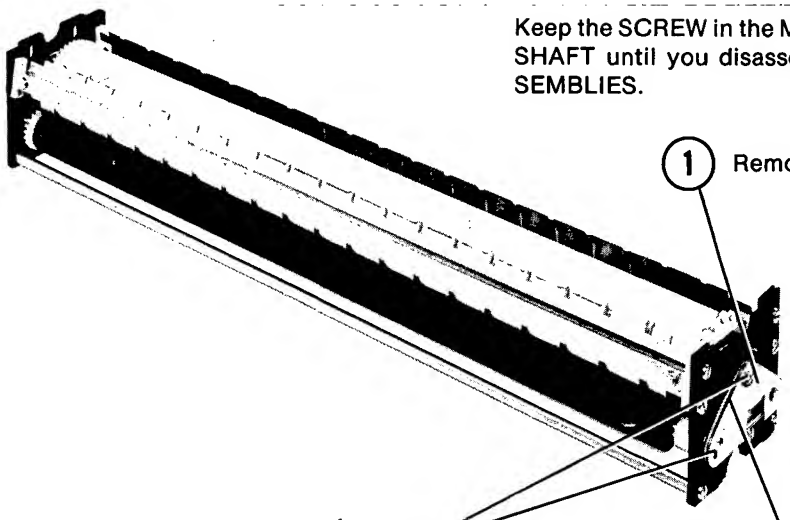

Drive Side
2 Loosen the SCREWS on the idle side. Pull the SIDE PLATE out.
SIDE PLATE
Idle Side
5 Remove the SHAFT and the ROLLER from the RACK ASSEMBLY.
RESILIENT ROLLER
4 Move the SPACER and the SHAFT toward the non-drive side.
SHAFT
KEYS
3 Move the ROLLER toward the idle side and remove the KEYS.
1 Remove the following parts:
1. GEAR and KEY
2. SPACER
3. BEARING

FIGURE 2-18

NOTE

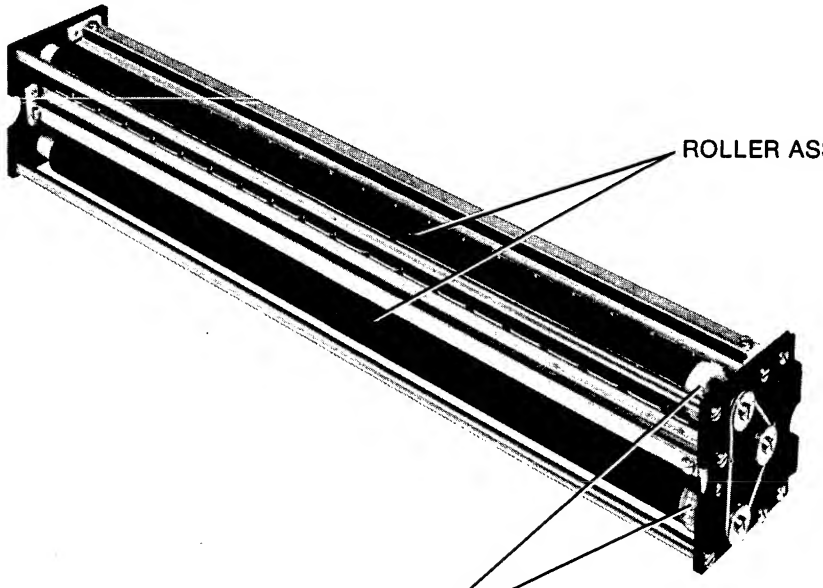
Keep the SCREW in the MAIN ROLLER ASSEMBLY SHAFT until you disassemble the 2 ROLLER ASSEMBLIES.



(1) Remove the LOCKING PLATE.

(3) Remove the SCREW from each ROLLER ASSEMBLY and remove the SHAFT from the ROLLER.

(2) Remove the SPRINGS from both sides of the TURNAROUND ASSEMBLY.



ROLLER ASSEMBLY (2)

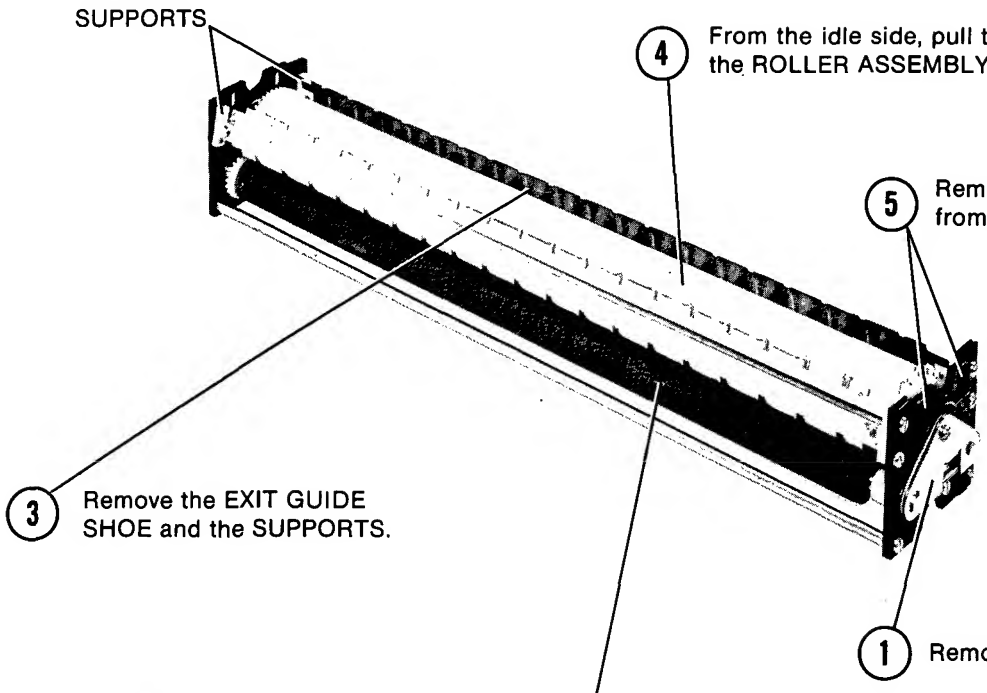
GEARS

CAUTION

When installing the 2 ROLLER ASSEMBLIES check that all GEARS engage in the TURNAROUND ASSEMBLIES.

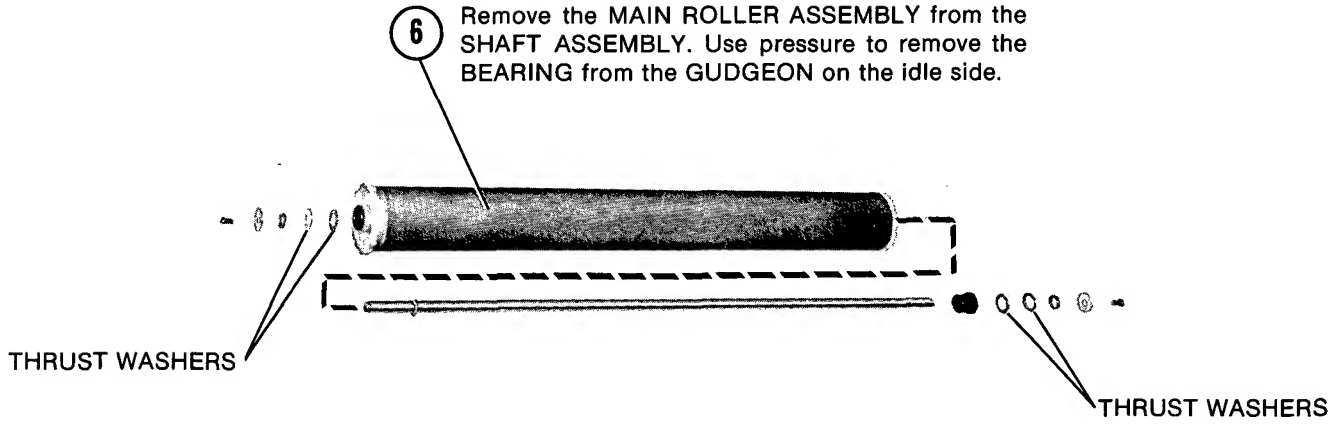
FIGURE 2-19

MAIN ROLLER ASSEMBLY


SUPPORTS
4 From the idle side, pull the SHAFT ASSEMBLY of the ROLLER ASSEMBLY out.
5 Remove the SCREWS from both SIDE PLATES.
3 Remove the EXIT GUIDE SHOE and the SUPPORTS.
1 Remove the LOCKING PLATE.
2 Remove the 2 ROLLER ASSEMBLIES. See figure 2-19.

NOTE

If the TURNAROUND ASSEMBLY is attached to the RACK, it is necessary to remove the RACK ROLLER above the EXIT GUIDE SHOE ASSEMBLY.


6 Remove the MAIN ROLLER ASSEMBLY from the SHAFT ASSEMBLY. Use pressure to remove the BEARING from the GUDGEON on the idle side.
THRUST WASHERS
THRUST WASHERS

NOTE

Before you install the MAIN ROLLER ASSEMBLY, check that the THRUST WASHERS are on the SHAFT ASSEMBLY. Tighten or loosen the CHAIN if necessary.

FIGURE 2-20

MAIN DRIVE AND DRYER DRIVE GEARMOTOR

NOTE

The GEARMOTOR has an AUTOMATIC RESET THERMAL PROTECTOR.

WARNING

Dangerous Voltage

1. Disconnect the main power.
2. Engage the DRIVE CHAIN and the SPROCKET.
3. Install the 4 MOUNTING SCREWS and adjust the DRIVE CHAIN and the SPROCKET.
4. See the Wiring Diagram in Section 7 for electrical connections.

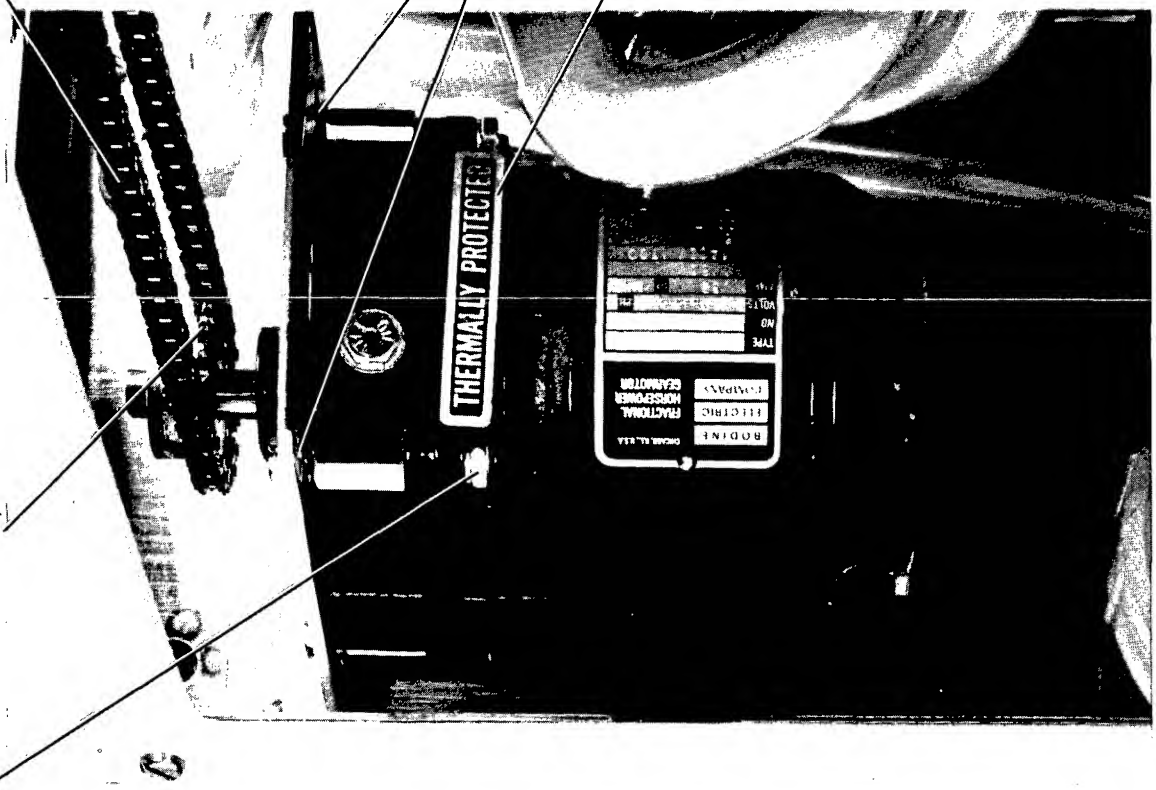

Tighten the 4 SCREWS to fasten the GEARMOTOR into position.
AUTOMATIC RESET THERMAL PROTECTOR
SPROCKET
THERMALLY PROTECTED

FIGURE 2-21

BEARINGS of the MAIN DRIVE SHAFT

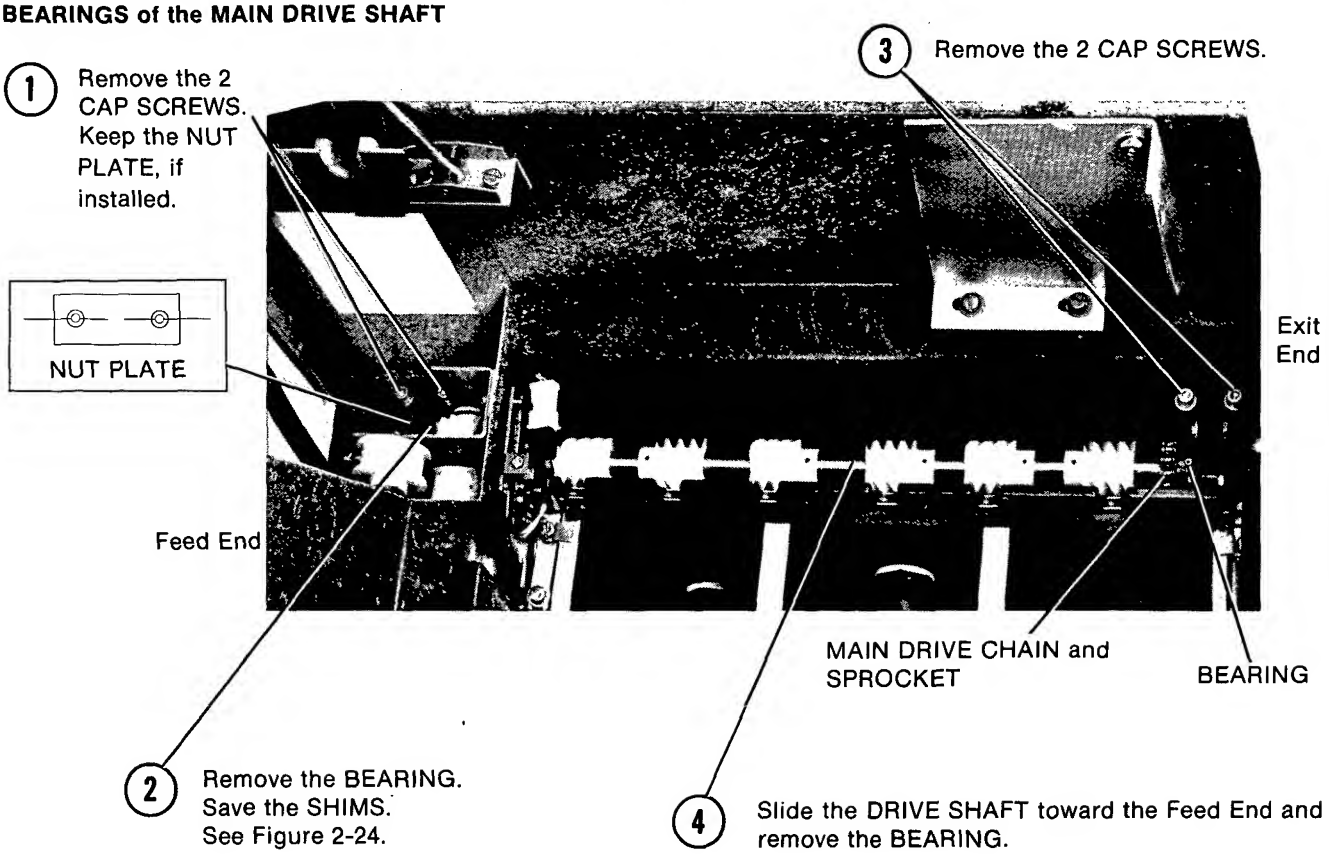

1 Remove the 2 CAP SCREWS. Keep the NUT PLATE, if installed.
NUT PLATE
3 Remove the 2 CAP SCREWS.
Exit End
Feed End
MAIN DRIVE CHAIN and SPROCKET
BEARING
2 Remove the BEARING. Save the SHIMS. See Figure 2-24.
4 Slide the DRIVE SHAFT toward the Feed End and remove the BEARING.

FIGURE 2-22

MAIN DRIVE SHAFT and WORM GEARS

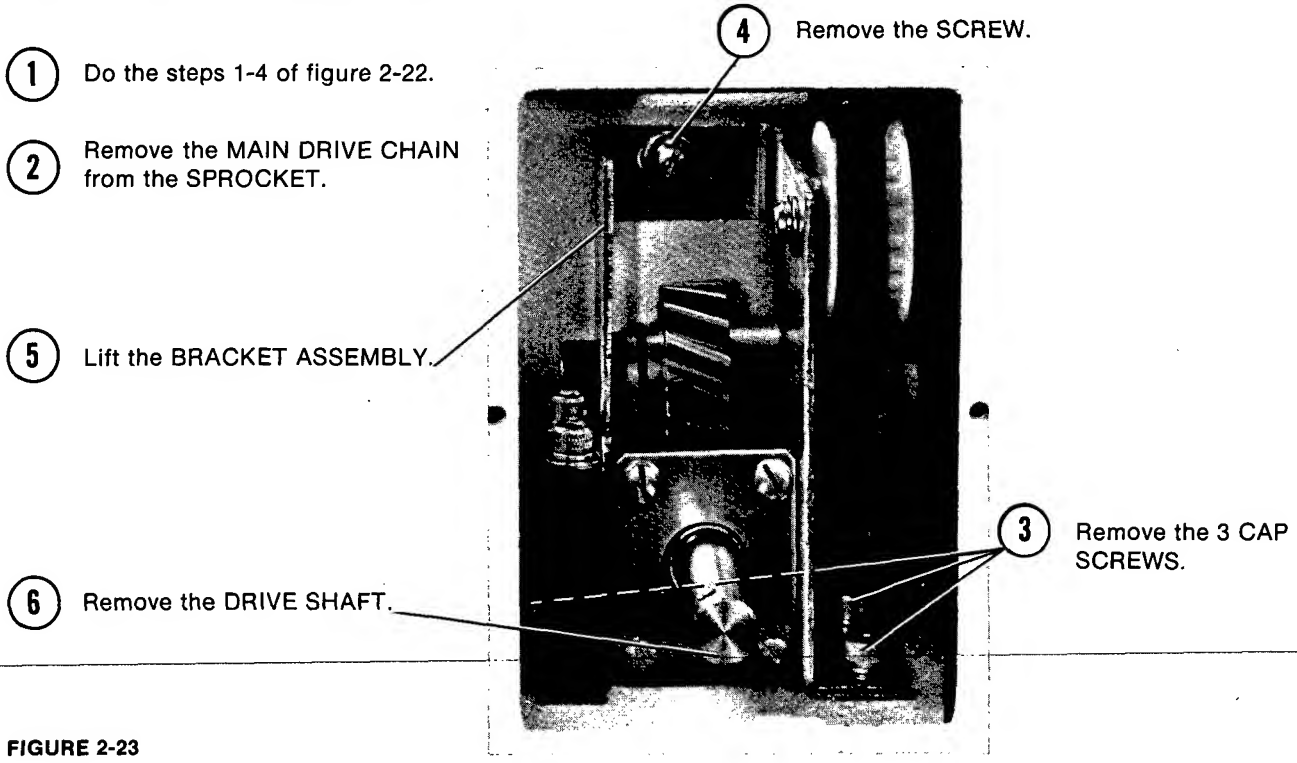

1 Do the steps 1-4 of figure 2-22.
2 Remove the MAIN DRIVE CHAIN from the SPROCKET.
4 Remove the SCREW.
5 Lift the BRACKET ASSEMBLY.
3 Remove the 3 CAP SCREWS.
6 Remove the DRIVE SHAFT.

FIGURE 2-23

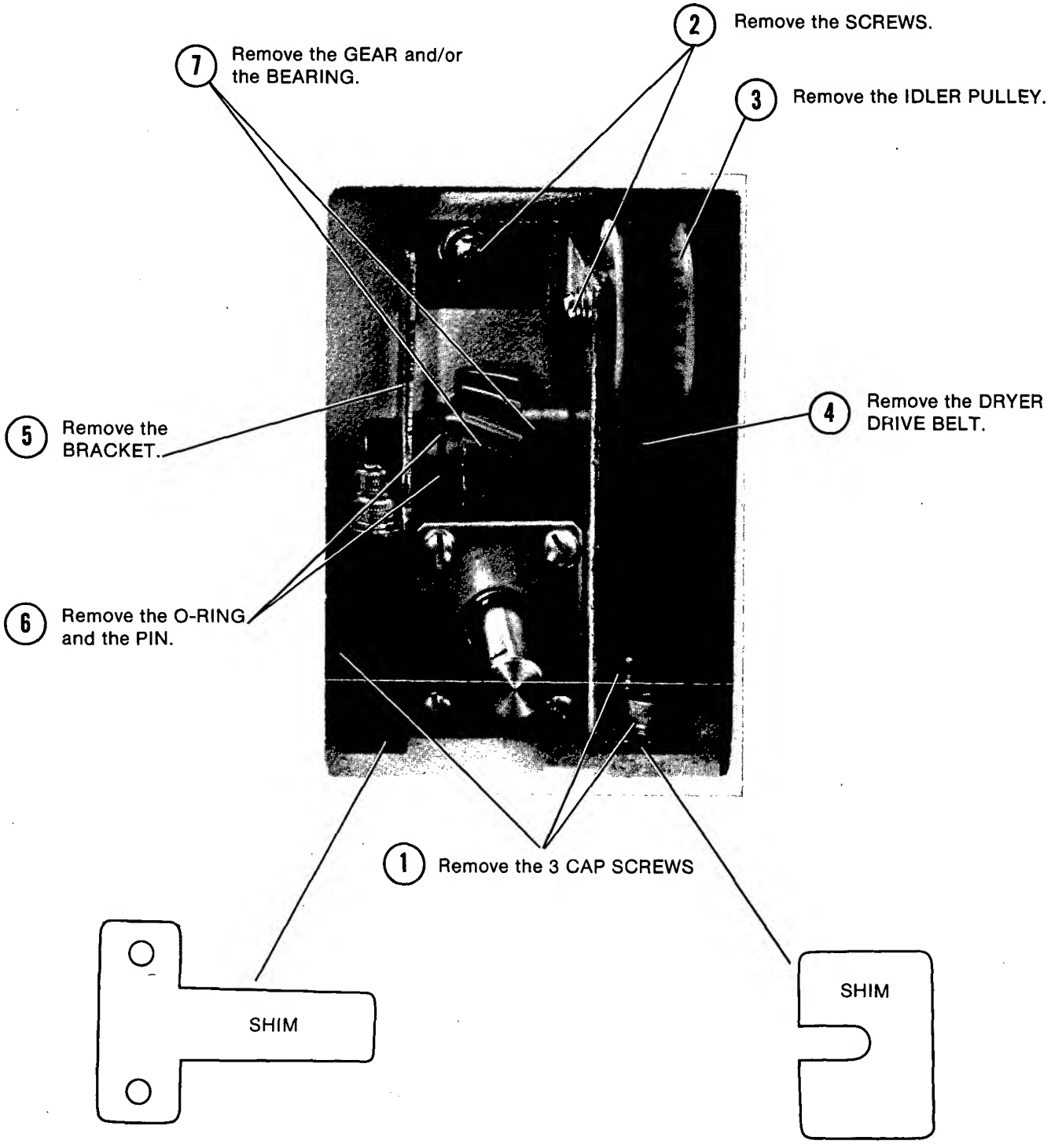

2 Remove the SCREWS.
7 Remove the GEAR and/or the BEARING.
3 Remove the IDLER PULLEY.
5 Remove the BRACKET.
4 Remove the DRYER DRIVE BELT.
6 Remove the O-RING and the PIN.
1 Remove the 3 CAP SCREWS
SHIM
SHIM

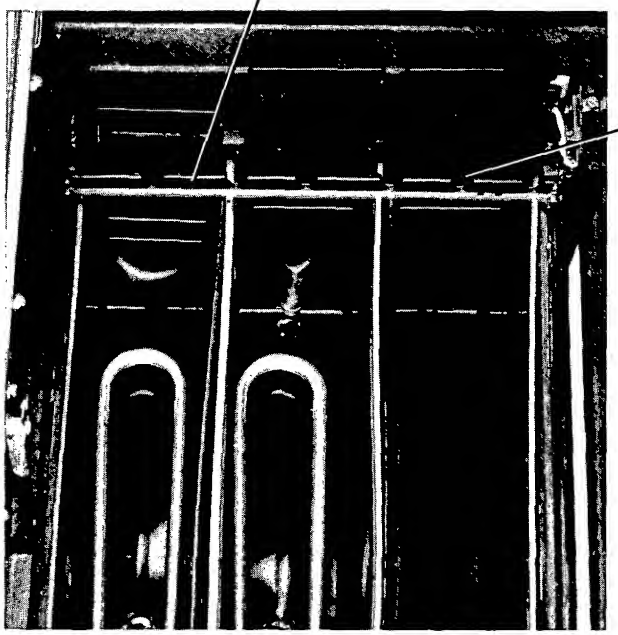
FIGURE 2-24

DEVELOPER and FIXER TANKS - HEAT EXCHANGERS

WARNING

Dangerous Voltage

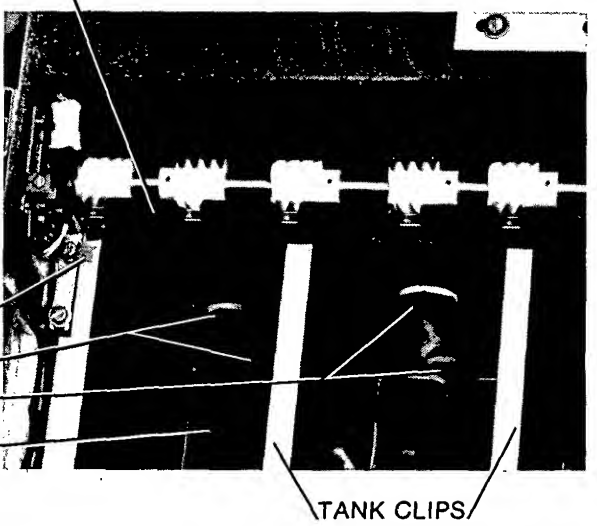
1. Disconnect the main power.
2. Disconnect the water supply.



3. Drain the 3 TANKS.
4. Remove the SCREWS and the RACK SUPPORT BARS. Keep the HOLD-DOWN CLIPS. Remove the gasket material and TANK CLIPS.

NOTE

Check that all HOLD-DOWN CLIPS are installed in their original positions.



5. Remove all external tubing from the TANKS.
6. Remove the 4 SIDE FITTINGS.

   Lift out the TANK by tilting the idle side first.
7. Remove the HEAT EXCHANGER by removing fittings on the underside of the tanks.

CAUTION

When you install a DEVELOPER TANK, install the largest FITTING in the bottom recirculation hole.

8. Install the RACK SUPPORT BARS with the RACK ASSEMBLIES in position. Check that the MAIN DRIVE GEAR from each RACK ASSEMBLY is in position in the center of the WORMS. Move the RACK SUPPORT BAR on the drive side against the SPACER of the TOP ROLLER. Move the RACK SUPPORT BAR on the non-drive side so that there is a 2.4 mm (3/32-inch) clearance between the RACK SUPPORT BAR and the SPACER.

FIGURE 2-25

WARNING

Dangerous Voltage

(1) Disconnect the main power.

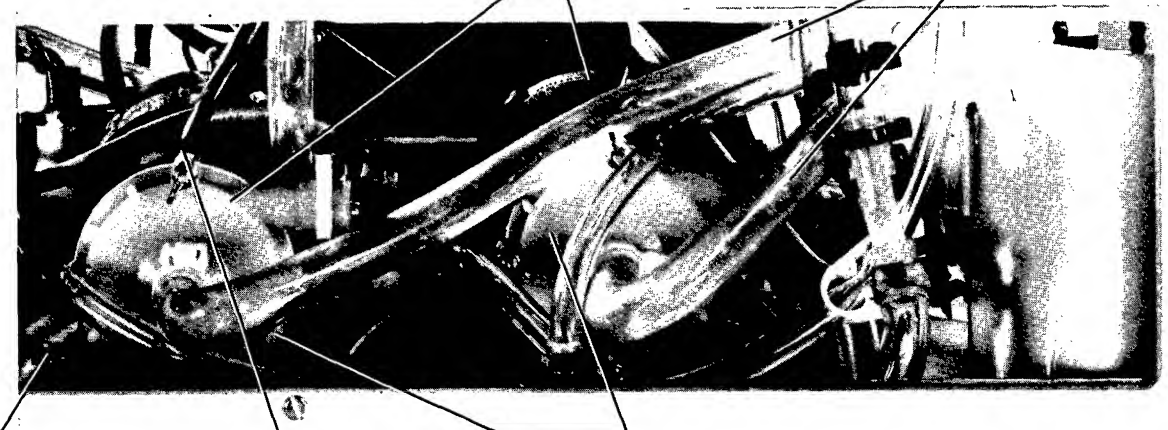

RECIRCULATION PUMP (2)
(2) Disconnect the TUBING.
(4) Loosen the 2 MOUNTING SCREWS on each PUMP.
(5) Remove the PUMPS from the PROCESSOR.
(3) Remove tne STRAIN RELIEF and LEADS.

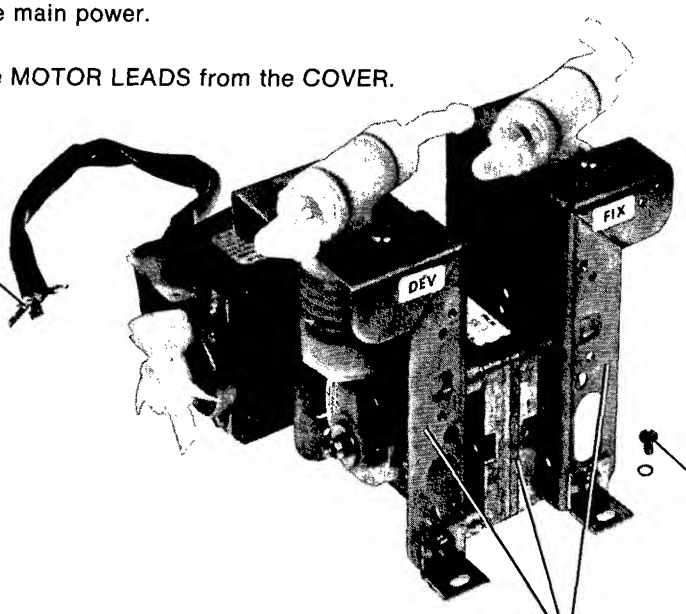
FIGURE 2-26

REPLENISHER PUMP ASSEMBLY

WARNING

Dangerous Voltage

1. Disconnect the main power.
2. Disconnect the MOTOR LEADS from the COVER.



3. Remove the SCREWS.
4. Remove the PUMP ASSEMBLY from the exit end of the PROCESSOR.

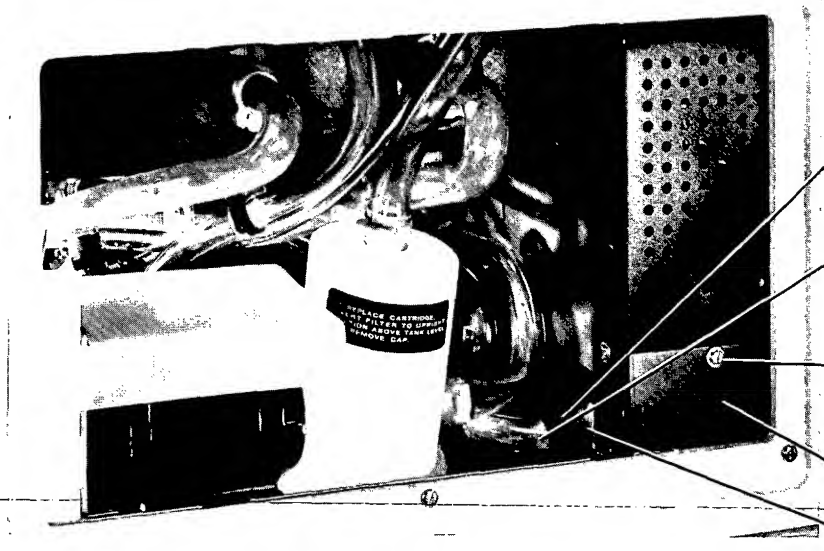
FIGURE 2-27

FLOW CONTROL VALVE

WARNING

Dangerous Voltage

1. Disconnect the main power.
2. Disconnect the water supply.
3. Drain the WASH TANK.



4. Remove the CLAMP.
5. Remove the TUBE.
6. Remove the existing SCREWS and COVER.

COVER

7. Remove the VALVE and the BRACKET ASSEMBLY.

FIGURE 2-28

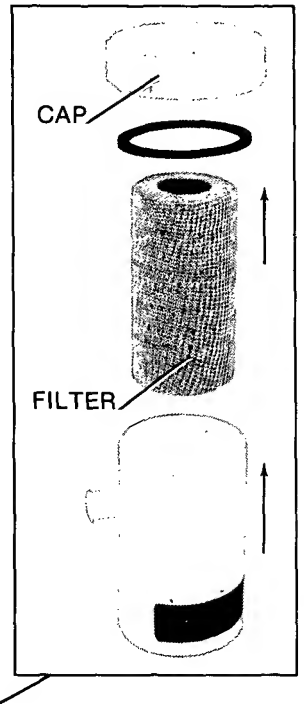
WARNING

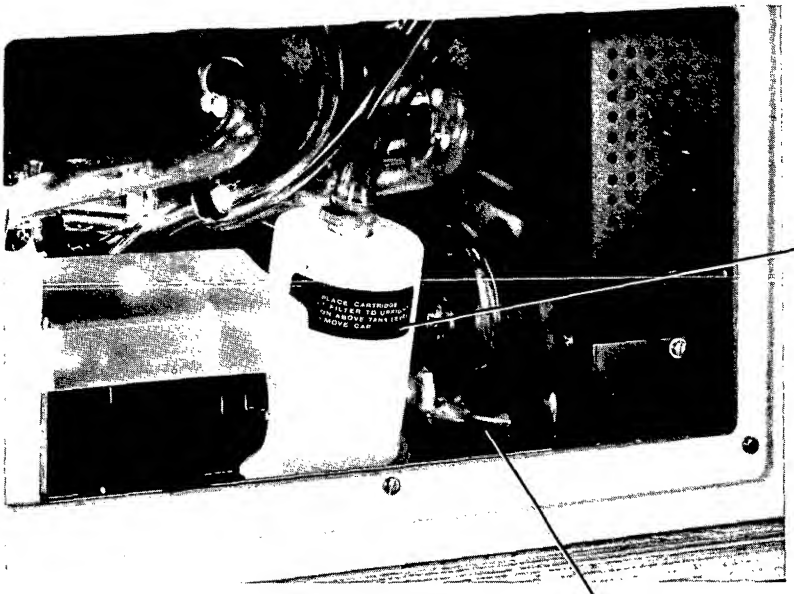
Dangerous Voltage

1. Disconnect the main power.

NOTE

Soak the FILTER in 49°C (120°F) water for ½ minute before installing it.





2. Lift the FILTER ASSEMBLY out of the PROCESSOR with the CAP up.

CAUTION

The FILTER ASSEMBLY has to be above the solution level in the TANKS. Keep the TUBING free from kinks.

FIGURE 2-29

SECTION 3 DIAGNOSTIC PROCEDURES

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• ELECTRICAL CHECKLIST	3-6
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Figure 3-3 Diagnostic Flowchart	3-11
Figure 3-4 Diagnostic Flowchart	3-12
Figure 3-5 Circuit Board Flowchart	3-13, 3-14
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Figure 3-8 Diagnostic Flowchart	3-17
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• PROCESSOR COMPLETE	
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SECTION 3 DIAGNOSTIC PROCEDURES

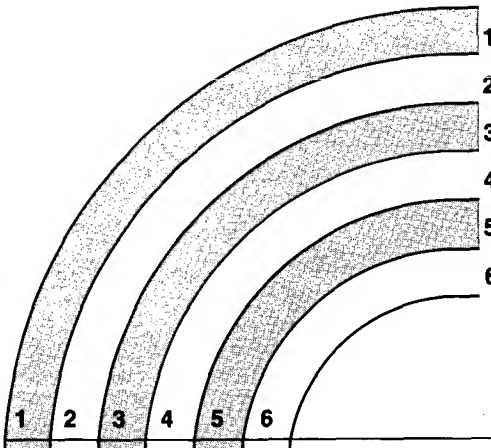
NOTE

Always check the MECHANICAL CHECKLIST first. If it is necessary to have additional diagnostic procedures, go to the ELECTRICAL CHECKLIST or the A, B, or C diagrams.

Subject	Diagram/Figure No.	Page
•MECHANICAL CHECKLIST •ELECTRICAL CHECKLIST		3,4 3-6
A. DRYER TEMPERATURE CONTROL, MAIN DRIVE AND WATER SAVER SOLENOIDS	•SEQUENCE OF OPERATION FLOWCHART 3-1	3-9
No Blower Motor, No Drive Motor, No Dryer Heater, No Water Saver Solenoids condition	•Diagnostic Flowchart 3-2	3-10
No Dryer Heat condition	•Diagnostic Flowchart 3-3	3-11
No Blower Motor, No Dryer Heat condition	•Diagnostic Flowchart 3-4	3-12
	•Circuit Board Flowchart 3-5 •Schematic Diagram 3-6	3-13 3-15
B. REPLENISHMENT CONTROL	•Sequence of Operation Flowchart 3-7	3-16
No Replenishment, No Buzzer, Safelight On condition	•Diagnostic Flowchart 3-8	3-17
Safelight On, No Replenishment condition	•Diagnostic Flowchart 3-9	3-18
	•Circuit Board Flowchart 3-10 •Schematic Diagram 3-11	3-19 3-20
C. DEVELOPER TEMPERATURE CONTROL	•Sequence of Operation Flowchart 3-12	3-21
No Developer Heat and Ready Lamp I3 Off Condition	•Diagnostic Flowchart 3-13	3-22
No Developer Heat and Ready Lamp I3 On Condition	•Diagnostic Flowchart 3-14	3-23
Developer Heater On All the Time and Ready Lamp I3 On Condition	•Diagnostic Flowchart 3-15	3-24
	•Circuit Board Flowchart 3-16 •Schematic Diagram 3-17	3-25 3-26
D. PROCESSOR COMPLETE	•Sequence of Operation 3-18	3-27

MECHANICAL CHECKLIST

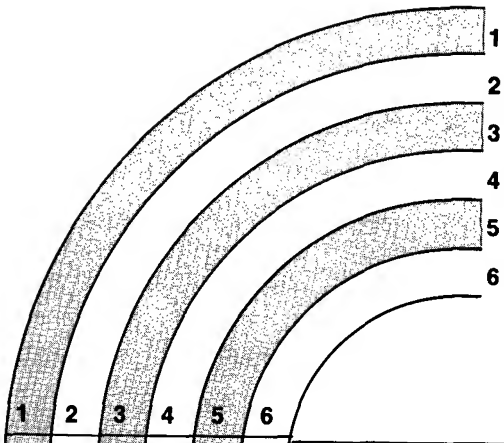
CONDITION



1	2	3	4	5	6	
●					●	**Film Feeding Error** ***NOTE: Feed only single thicknesses of film. Feed next film only after film feed signal. If there is no film feed signal, refer situation to qualified personnel.***
		●	●			Feed only compatible films.
●					●	Check that the processor circuit breaker is "ON." Check that all racks and crossovers are seated correctly.
●						Adjust the tension of the dryer drive belt, if necessary.
	●					Check the surface of each roller for cleanliness and smoothness, especially in the developer turnaround.
●			●			Check that the dryer air tubes are in the correct position.
	●					Remove any dirt from the slits in the dryer air tubes. Use a bottle brush and rinse with water.
●	●	●	●	●		Check that the processor circuit breaker is "ON." Check the replenishment system for: tubing kinks and operation of the replenisher pump and detector switches.
	●		●			The dryer thermostat setting necessary for good drying changes with ambient conditions and number and types of film fed. Increase the thermostat setting to the LOWEST possible temperature consistent with good drying.
●			●			Wash the air filter with warm soapy water monthly or as necessary.
●	●		●			Check that the top cover is closed or depress the lever of the interlock switch.
	●					Remove deposits of chemicals from the feed tray and detector rollers.
●	●				●	Clean any bacterial growth in the wash tank with a mild solution of chlorine bleach. Use 60 mL (2 fluidounces) of bleach per 3.8 litres (1 gallon) of water. ***NOTE: Always drain the wash tank when the processor is shut down.***
●	●	●	●		●	Remove any improperly mixed, exhausted, or contaminated chemicals. Install a new developer filter if necessary. Check that replenishment rates are correct. Fill the replenisher tanks if necessary. ***NOTE: Mix the developer replenisher in quantity not to exceed a 2-week supply.*** ***Always use a splash guard and rack drip tray when lifting the fixer rack to prevent contaminating the developer.*** ***Read the instructions provided with the chemicals. Use the correct amount of developer starting solution.***

MECHANICAL CHECKLIST

CONDITION


1 - Transport Failure
2 - Surface Artifacts
3 - Abnormal Film Densities
4 - Wet Films
5 - Low Solution Levels
6 - Overlapping of Films

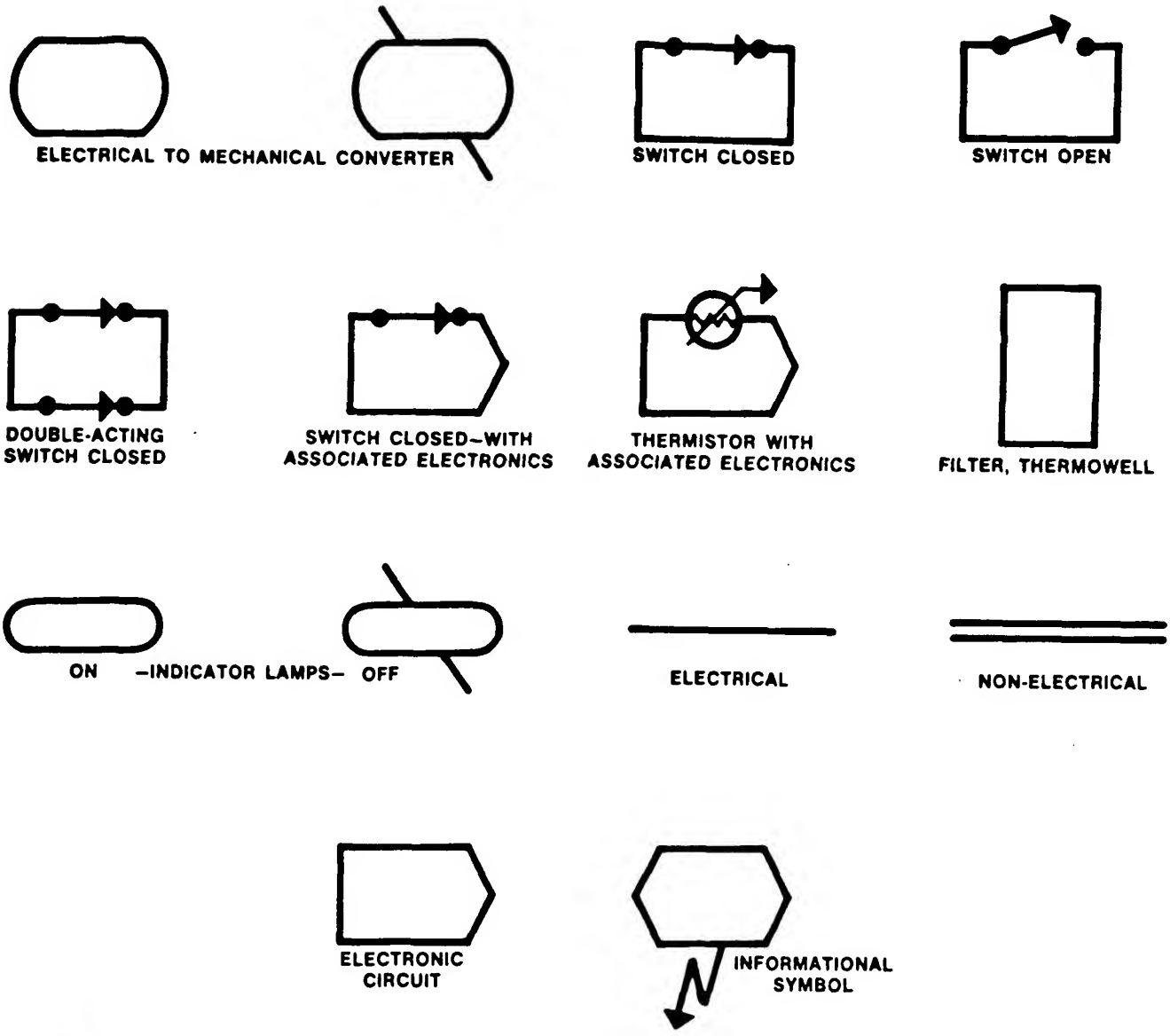
1	2	3	4	5	6	
●	●					Adjust the guide shoes correctly. ***NOTE: Most often in the developer turnaround. Adjust the tips of the guide shoes in the exit turnaround as close as possible to the rack roller above them.***
●	●					Check that all rollers are in the correct positions and rotating correctly.
●	●					Check that all roller gears, sprockets, and idlers engage correctly.
●	●					Install new rollers if they have broken or worn gudgeons, especially the turnaround rollers.
●	●					Ream or install new bearings if necessary to keep the turnaround rollers rotating correctly.
●	●					Adjust the rack chain so that rollers rotate smoothly and the chain is not too tight. ***NOTE: Lower the turnaround assembly squarely.***
		●				With the processor on, check for movement of the solutions at the surface. Movement indicates proper recirculation. If no movement is observed, check the recirculation system for: tubing kinks, pump operation, developer filter, etc.
				●		Check for solution in the replenisher tanks. Fill if necessary. ***NOTE: Mix developer replenisher in quantities not to exceed a 2-week supply.***
●	●					If wash water is dirty, scrub down the rack and tank thoroughly when the water clears. ***NOTE: If this condition occurs frequently, consider the use of filters on the incoming water line.***
				●		Any dirt behind the check valve poppet seats or distorted poppets prevent proper replenishment. Have qualified personnel clean or install new poppets.
			●			Check that the dryer air exhaust is free from any obstructions and is installed correctly. See the specifications in the Installation Instructions.
●						Check that the processor circuit breaker is "ON." Check the turnaround assembly for correct adjustment. The turnarounds have to be square with the rack.
		●				With a thermometer of known accuracy, check the temperature of the developer. Have qualified personnel make adjustments if necessary. ***NOTE: The "READY" light must be flickering before feeding film. Check that the incoming supply does not exceed 26.5° C (80° F).***
●						Check for missing or improper size orifice in the fixer recirculation line. Install new if necessary.
		●				Check that the correct bulb is in the safelight.
		●				Check the following: The cover is tight on the processor. The gasket is lighttight.

ELECTRICAL CHECKLIST

NOTE

Always check the MECHANICAL CHECKLIST first. If additional diagnostic procedures are necessary, see the ELECTRICAL CHECKLIST below.

SYSTEM	CONDITION	FIGURE DESCRIPTION	PAGE
A. Dryer Temperature Control, Main Drive and Water Saver and Water Saver Solenoids	———	3-1 Sequence of Operation 3-5 Circuit Board Flowchart 3-6 Schematic Diagram	
	No BLOWER MOTOR No DRIVE MOTOR No WATER SAVER SOLENOIDS	3-2 Diagnostic Flowchart	
	No DRYER HEAT	3-3 Diagnostic Flowchart	
	No BLOWER MOTOR	3-4 Diagnostic Flowchart	
B. Replenishment Control System	———	3-7 Sequence of Operation 3-10 Circuit Board Flowchart 3-11 Schematic Diagram	
	REPLENISHER PUMP Not Operating	3-8 Diagnostic Flowchart	
	SAFELIGHT On No REPLENISHMENT	3-9 Diagnostic Flowchart	
C. Developer Temperature Control System	———	3-12 Sequence of Operation 3-16 Circuit Board Flowchart 3-17 Schematic Diagram	
	No DEVELOPER HEAT AND READY LAMP I3 Off	3-13 Diagnostic Flowchart	
	No DEVELOPER HEAT AND READY LAMP I3 On	3-14 Diagnostic Flowchart	
	DEVELOPER HEATER On ALL THE TIME AND READY LAMP I3 On	3-15 Diagnostic Flowchart	
D. Processor Complete	———	3-18 Sequence of Operation	


ELECTRICAL TO MECHANICAL CONVERTER
SWITCH CLOSED
SWITCH OPEN
DOUBLE-ACTING SWITCH CLOSED
SWITCH CLOSED–WITH ASSOCIATED ELECTRONICS
THERMISTOR WITH ASSOCIATED ELECTRONICS
FILTER, THERMOWELL
ON
–INDICATOR LAMPS–
OFF
ELECTRICAL
NON-ELECTRICAL
ELECTRONIC CIRCUIT
INFORMATIONAL SYMBOL
A N D
All inputs are necessary for correct operation
O R
Only one input is necessary for correct operation

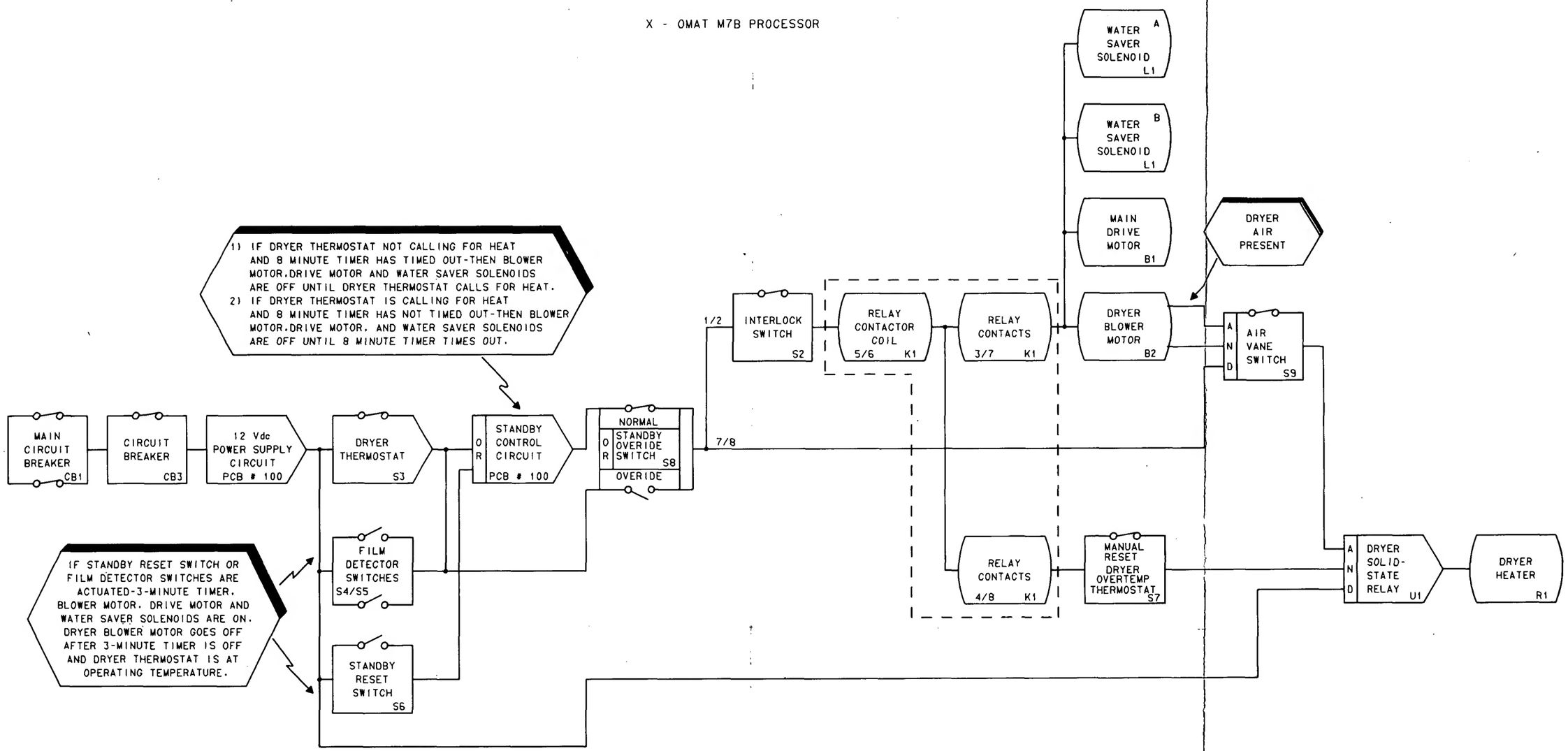
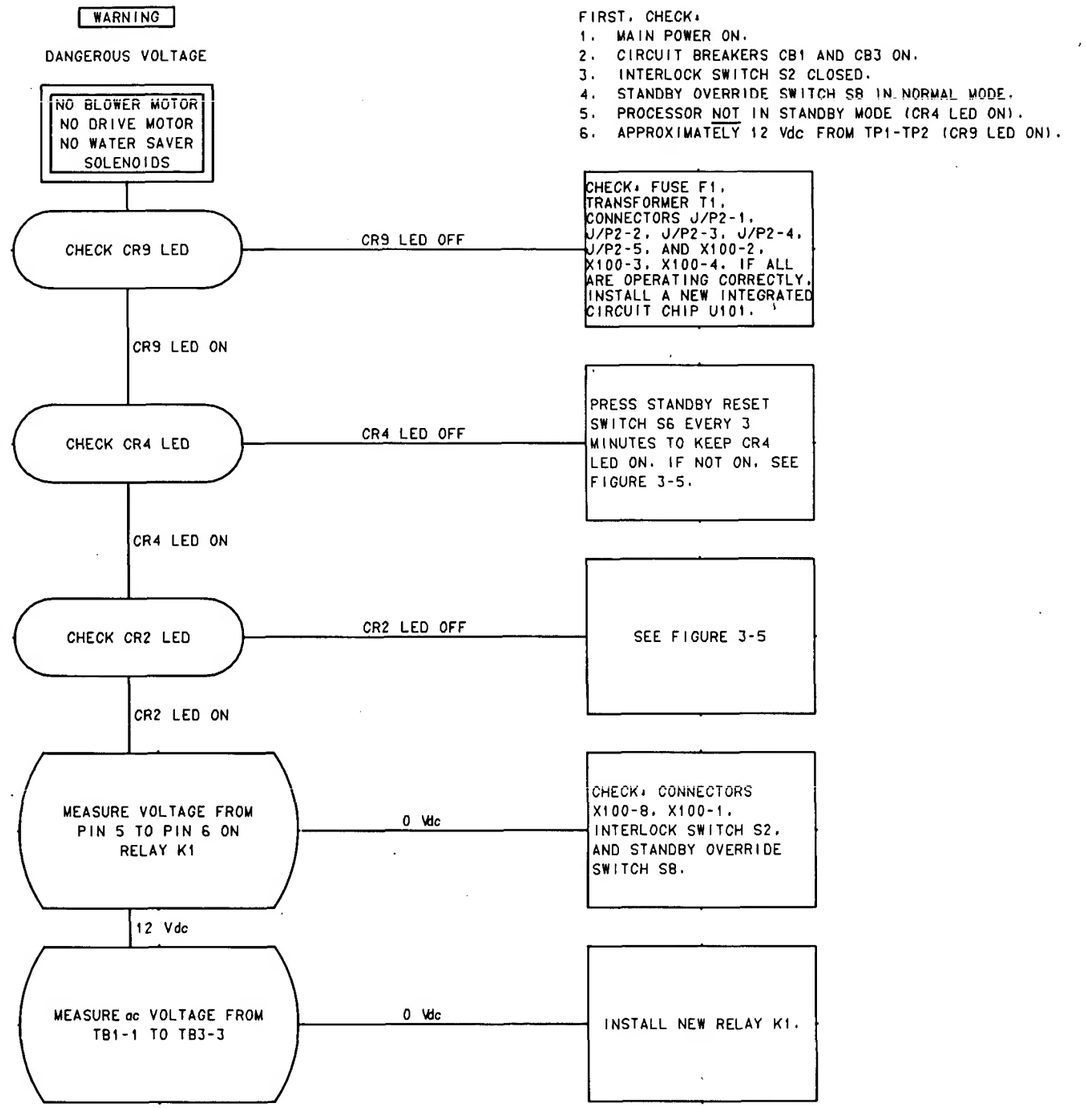
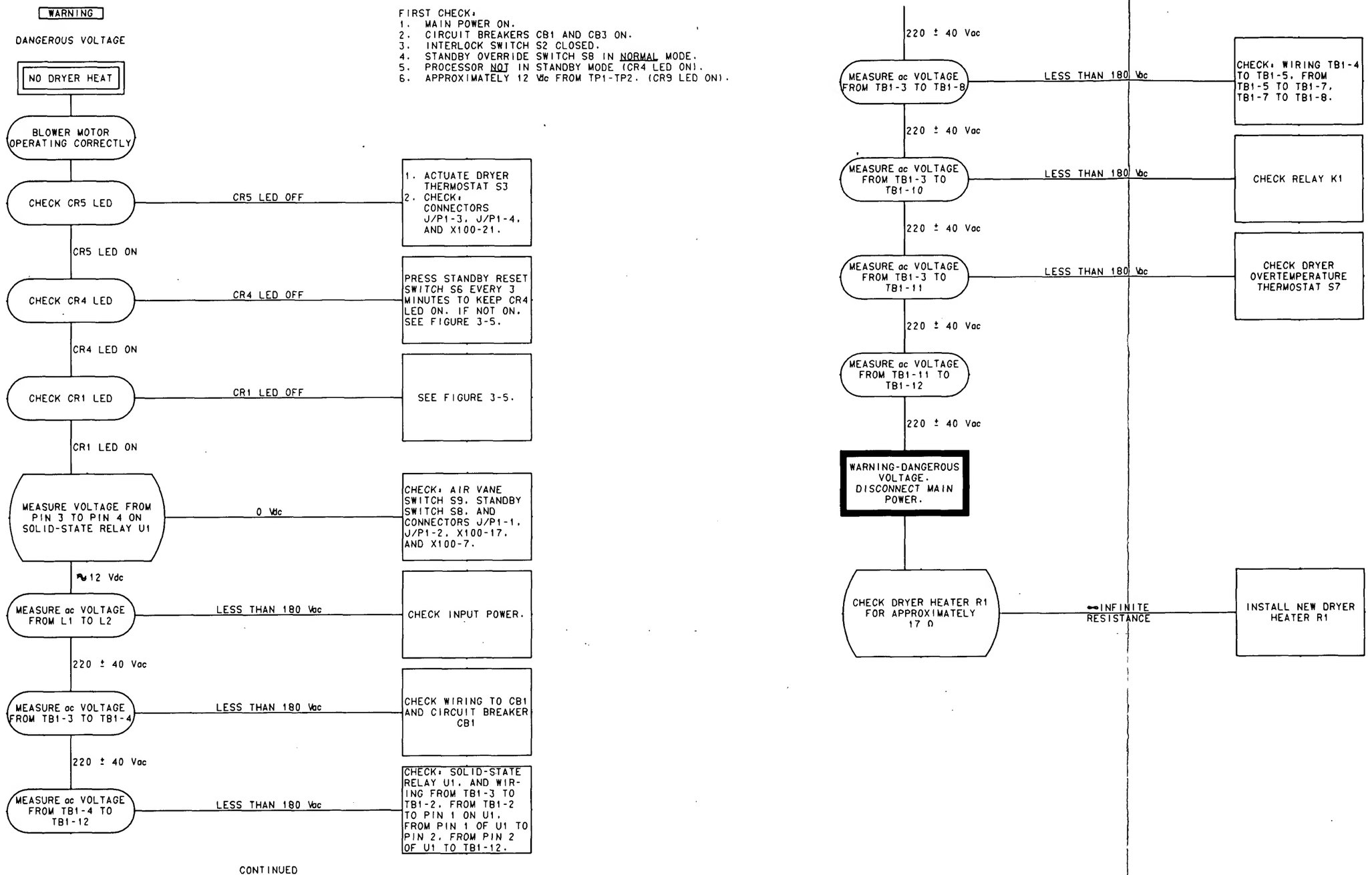

X - OMAT M7B PROCESSOR
1) IF DRYER THERMOSTAT NOT CALLING FOR HEAT AND 8 MINUTE TIMER HAS TIMED OUT-THEN BLOWER MOTOR,DRIVE MOTOR AND WATER SAVER SOLENOIDS ARE OFF UNTIL DRYER THERMOSTAT CALLS FOR HEAT.
2) IF DRYER THERMOSTAT IS CALLING FOR HEAT AND 8 MINUTE TIMER HAS NOT TIMED OUT-THEN BLOWER MOTOR,DRIVE MOTOR, AND WATER SAVER SOLENOIDS ARE OFF UNTIL 8 MINUTE TIMER TIMES OUT.
MAIN CIRCUIT BREAKER CB1
CIRCUIT BREAKER CB3
12 Vdc POWER SUPPLY CIRCUIT PCB # 100
DRYER THERMOSTAT S3
STANDBY CONTROL CIRCUIT PCB # 100
NORMAL
STANDBY OVERIDE SWITCH S8
OVERIDE
1/2
INTERLOCK SWITCH S2
RELAY CONTACTOR COIL 5/6 K1
RELAY CONTACTS 3/7 K1
WATER SAVER SOLENOID A L1
WATER SAVER SOLENOID B L1
MAIN DRIVE MOTOR B1
DRYER BLOWER MOTOR B2
DRYER AIR PRESENT
AND
AIR VANE SWITCH S9
7/8
IF STANDBY RESET SWITCH OR FILM DETECTOR SWITCHES ARE ACTUATED-3-MINUTE TIMER, BLOWER MOTOR, DRIVE MOTOR AND WATER SAVER SOLENOIDS ARE ON. DRYER BLOWER MOTOR GOES OFF AFTER 3-MINUTE TIMER IS OFF AND DRYER THERMOSTAT IS AT OPERATING TEMPERATURE.
FILM DETECTOR SWITCHES S4/S5
STANDBY RESET SWITCH S6
RELAY CONTACTS 4/8 K1
MANUAL RESET DRYER OVERTEMP THERMOSTAT S7
AND
DRYER SOLID-STATE RELAY U1
DRYER HEATER R1

FIGURE 3-1 **Sequence of Operation Flowchart for the Dryer Temperature Control, Main Drive, and Water Saver Solenoids on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**


WARNING
DANGEROUS VOLTAGE
NO BLOWER MOTOR
NO DRIVE MOTOR
NO WATER SAVER
SOLENOIDS
FIRST, CHECK:
1. MAIN POWER ON.
2. CIRCUIT BREAKERS CB1 AND CB3 ON.
3. INTERLOCK SWITCH S2 CLOSED.
4. STANDBY OVERRIDE SWITCH S8 IN NORMAL MODE.
5. PROCESSOR NOT IN STANDBY MODE (CR4 LED ON).
6. APPROXIMATELY 12 Vdc FROM TP1-TP2 (CR9 LED ON).
CHECK CR9 LED
CR9 LED OFF
CHECK: FUSE F1, TRANSFORMER T1, CONNECTORS J/P2-1, J/P2-2, J/P2-3, J/P2-4, J/P2-5, AND X100-2, X100-3, X100-4. IF ALL ARE OPERATING CORRECTLY, INSTALL A NEW INTEGRATED CIRCUIT CHIP U101.
CR9 LED ON
CHECK CR4 LED
CR4 LED OFF
PRESS STANDBY RESET SWITCH S6 EVERY 3 MINUTES TO KEEP CR4 LED ON. IF NOT ON, SEE FIGURE 3-5.
CR4 LED ON
CHECK CR2 LED
CR2 LED OFF
SEE FIGURE 3-5
CR2 LED ON
MEASURE VOLTAGE FROM PIN 5 TO PIN 6 ON RELAY K1
0 Vdc
CHECK: CONNECTORS X100-8, X100-1, INTERLOCK SWITCH S2, AND STANDBY OVERRIDE SWITCH S8.
12 Vdc
MEASURE ac VOLTAGE FROM TB1-1 TO TB3-3
0 Vdc
INSTALL NEW RELAY K1.

NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

FIGURE 3-2 **Diagnostic Flowchart for the Dryer Temperature Control, Main Drive, and Water Saver Solenoids on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**


WARNING
DANGEROUS VOLTAGE
NO DRYER HEAT
BLOWER MOTOR OPERATING CORRECTLY
CHECK CR5 LED
CR5 LED OFF
1. ACTUATE DRYER THERMOSTAT S3
2. CHECK: CONNECTORS J/P1-3, J/P1-4, AND X100-21.
CR5 LED ON
CHECK CR4 LED
CR4 LED OFF
PRESS STANDBY RESET SWITCH S6 EVERY 3 MINUTES TO KEEP CR4 LED ON. IF NOT ON, SEE FIGURE 3-5.
CR4 LED ON
CHECK CR1 LED
CR1 LED OFF
SEE FIGURE 3-5.
CR1 LED ON
MEASURE VOLTAGE FROM PIN 3 TO PIN 4 ON SOLID-STATE RELAY U1
0 Vdc
CHECK: AIR VANE SWITCH S9, STANDBY SWITCH S8, AND CONNECTORS J/P1-1, J/P1-2, X100-17, AND X100-7.
12 Vdc
MEASURE ac VOLTAGE FROM L1 TO L2
LESS THAN 180 Vac
CHECK INPUT POWER.
220 ± 40 Vac
MEASURE ac VOLTAGE FROM TB1-3 TO TB1-4
LESS THAN 180 Vac
CHECK WIRING TO CB1 AND CIRCUIT BREAKER CB1
220 ± 40 Vac
MEASURE ac VOLTAGE FROM TB1-4 TO TB1-12
LESS THAN 180 Vac
CHECK: SOLID-STATE RELAY U1, AND WIRING FROM TB1-3 TO TB1-2, FROM TB1-2 TO PIN 1 ON U1, FROM PIN 1 OF U1 TO PIN 2, FROM PIN 2 OF U1 TO TB1-12.
FIRST CHECK:
1. MAIN POWER ON.
2. CIRCUIT BREAKERS CB1 AND CB3 ON.
3. INTERLOCK SWITCH S2 CLOSED.
4. STANDBY OVERRIDE SWITCH S8 IN NORMAL MODE.
5. PROCESSOR NOT IN STANDBY MODE (CR4 LED ON).
6. APPROXIMATELY 12 Vdc FROM TP1-TP2. (CR9 LED ON).
220 ± 40 Vac
MEASURE ac VOLTAGE FROM TB1-3 TO TB1-8
LESS THAN 180 Vac
CHECK: WIRING TB1-4 TO TB1-5, FROM TB1-5 TO TB1-7, TB1-7 TO TB1-8.
220 ± 40 Vac
MEASURE ac VOLTAGE FROM TB1-3 TO TB1-10
LESS THAN 180 Vac
CHECK RELAY K1
220 ± 40 Vac
MEASURE ac VOLTAGE FROM TB1-3 TO TB1-11
LESS THAN 180 Vac
CHECK DRYER OVERTEMPERATURE THERMOSTAT S7
220 ± 40 Vac
MEASURE ac VOLTAGE FROM TB1-11 TO TB1-12
220 ± 40 Vac
WARNING-DANGEROUS VOLTAGE. DISCONNECT MAIN POWER.
CHECK DRYER HEATER R1 FOR APPROXIMATELY 17 Ω
INFINITE RESISTANCE
INSTALL NEW DRYER HEATER R1

CONTINUED

FIGURE 3-3 **Diagnostic Flowchart for the Dryer Temperature Control, Main Drive, and Water Saver Solenoids on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**

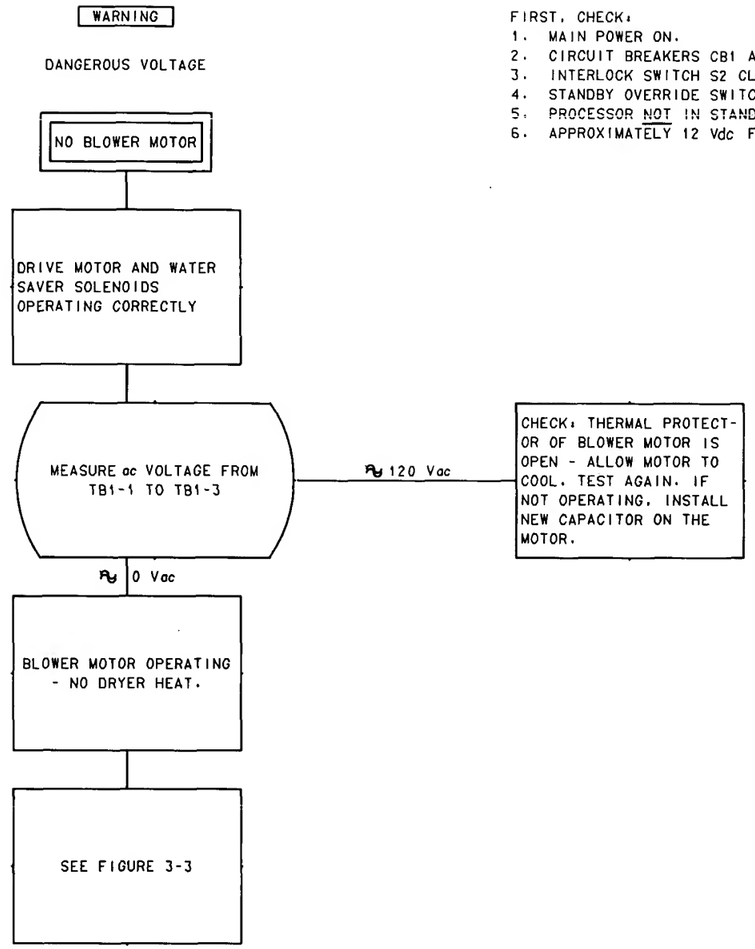
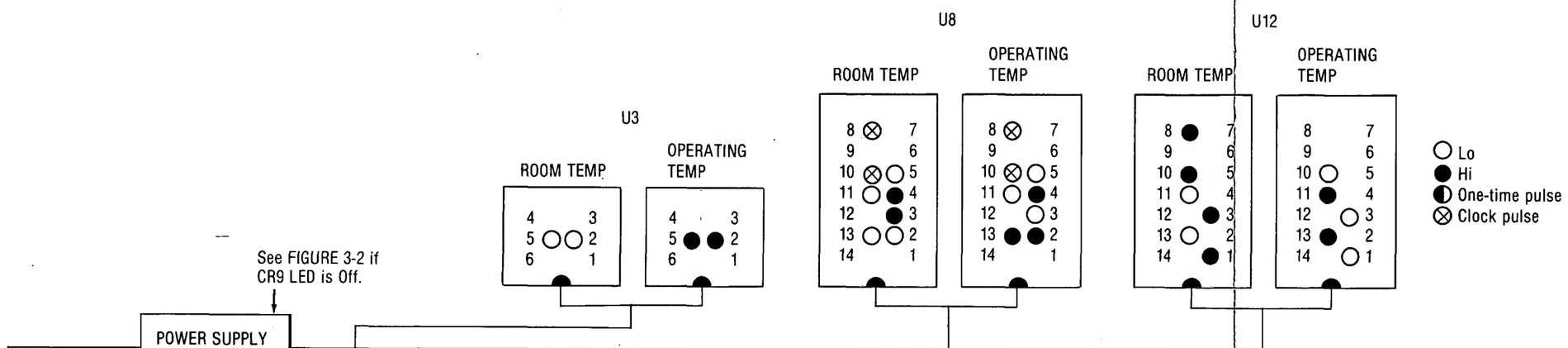

WARNING
DANGEROUS VOLTAGE
NO BLOWER MOTOR
DRIVE MOTOR AND WATER SAVER SOLENOIDS OPERATING CORRECTLY
MEASURE ac VOLTAGE FROM TB1-1 TO TB1-3
120 Vac
CHECK: THERMAL PROTECTOR OF BLOWER MOTOR IS OPEN - ALLOW MOTOR TO COOL. TEST AGAIN. IF NOT OPERATING, INSTALL NEW CAPACITOR ON THE MOTOR.
0 Vac
BLOWER MOTOR OPERATING - NO DRYER HEAT.
SEE FIGURE 3-3
FIRST, CHECK:
1. MAIN POWER ON.
2. CIRCUIT BREAKERS CB1 AND CB3 ON.
3. INTERLOCK SWITCH S2 CLOSED.
4. STANDBY OVERRIDE SWITCH S8 IN NORMAL MODE.
5. PROCESSOR NOT IN STANDBY MODE (CR4 LED ON).
6. APPROXIMATELY 12 Vdc FROM TP1-TP2 (CR9 LED ON).
NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

FIGURE 3-4 **Diagnostic Flowchart for the Dryer Temperature Control, Main Drive, and Water Saver Solenoids on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**

FIRST, CHECK:

1. At "ROOM TEMPERATURE": CR2 LED ON
   CR4 LED OFF
   CR8 LED OFF
2. At "OPERATING TEMPERATURE": CR2 LED OFF
   CR4 LED OFF
   CR8 LED OFF
3. FILM DETECTOR SWITCHES S4 and/or S5 Actuated Open.
4. INTERLOCK SWITCH S2 Actuated Closed.
5. STANDBY OVERRIDE SWITCH S8 In "Normal Mode".



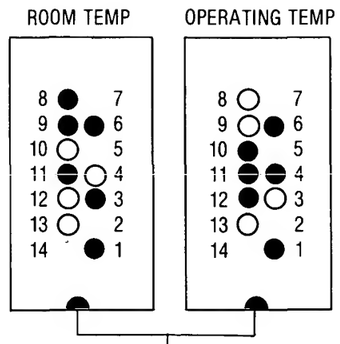
DRYER TEMPERATURE	POWER SUPPLY CIRCUIT + TP1—TP2 −	CR9 LED	U3 PIN 2	U3 PIN 5	CR5 LED	DRYER THERMOSTAT S3	U8 PIN 13	U8 PIN 11	U8 PIN 8 PIN 10	U8 PIN 5	U8 PIN 4	U8 PIN 3	U8 PIN 2	CR8 & CR4 LEDS	U12 PIN 1	U12 PIN 3	U12 PIN 8	U12 PIN 10	U12 PIN 11	U12 PIN 13
ROOM TEMPERATURE	12 V dc	ON	Lo	Lo	ON	ENERGIZED	Lo	Lo	1-second clock pulses	Lo	Hi	Hi	Lo	OFF	Hi	Hi	Hi	Hi	Lo	Lo
OPERATING TEMPERATURE	12 V dc	ON	Hi	Hi	OFF	NOT ENERGIZED	Hi	Lo		Lo	Hi	Lo	Hi	OFF	Lo	Lo	Lo	Lo	Hi See note 3.	Hi

NOTES:

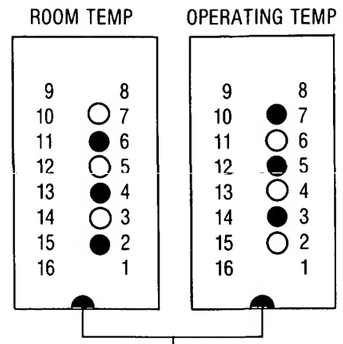
1. Voltages measured with respect to TP2 unless otherwise noted.
2. Voltages measured by a multimeter with an input impedance of 20,000 ohms per volt dc or more.
3. Goes Hi after 8-minute timer times out (CR8 LED is off).
4. Lo = Less than 1V dc
   Hi = Greater than 10V dc

FIGURE 3-5 **Circuit Board Flowchart for the Dryer Temperature Control, Main Drive, and Water Saver Solenoids on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**

U17

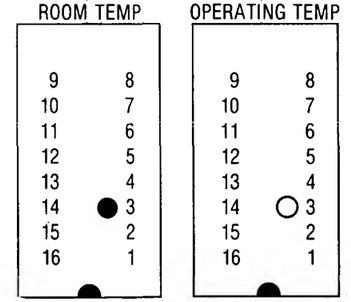


U16



DRYER TEMPERATURE	U17										U16					
	PIN 13	PIN 12	PIN 11	PIN 10	PIN 9	PIN 8	PIN 6	PIN 4	PIN 3	PIN 1	PIN 7	PIN 6	PIN 5	PIN 4	PIN 3	PIN 2
ROOM TEMPERATURE	Lo	Lo	Hi	Lo	Hi	Hi	Hi	Lo	Hi	Hi	Lo	Hi	Lo	Hi	Lo	Hi
OPERATING TEMPERATURE	Lo	Hi	Hi	Hi	Lo	Lo	Hi	Hi	Lo	Hi	Hi	Lo	Hi	Lo	Hi	Lo

U7



NO BLOWER MOTOR, DRIVE MOTOR, or WATER SAVER SOLENOIDS	U7 PIN 3	CR2 LED	TRANSISTOR Q2	RELAY K1 CONTACTS		RELAY K1 CONTACTOR COIL		BLOWER MOTOR B2	DRIVE MOTOR B1	WATER SAVER SOLENOIDS L1
				3	7	5	6			
ROOM TEMPERATURE	Hi	ON	ON	0 V ac	0 V ac	ENERGIZED		ON	ON	ON
OPERATING TEMPERATURE	Lo	OFF	OFF	120 V	120 V	NOT ENERGIZED		OFF	OFF	OFF

NO DRYER HEATER	CR5 and CR1 LEDS	TRANSISTOR Q1	SOLID-STATE RELAY U1		SOLID-STATE RELAY U1	RELAY K1 CONTACTS		DRYER HEATER R1
			PIN 4	PIN 3		4	8	
ROOM TEMPERATURE	ON	ON	0 V dc	12 V dc	ENERGIZED	ENERGIZED		ON
OPERATING TEMPERATURE	OFF	OFF	12 V dc	12 V dc	NOT ENERGIZED	ENERGIZED		OFF

CONDITION	SEE FIGURE
NO BLOWER MOTOR, DRIVE MOTOR, or WATER SAVER SOLENOIDS	3-2
NO DRYER HEATER	3-3
NO BLOWER MOTOR	3-4

FIGURE 3-5 (continued) **Circuit Board Flowchart for the Dryer Temperature Control, Main Drive, and Water Saver Solenoids on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**

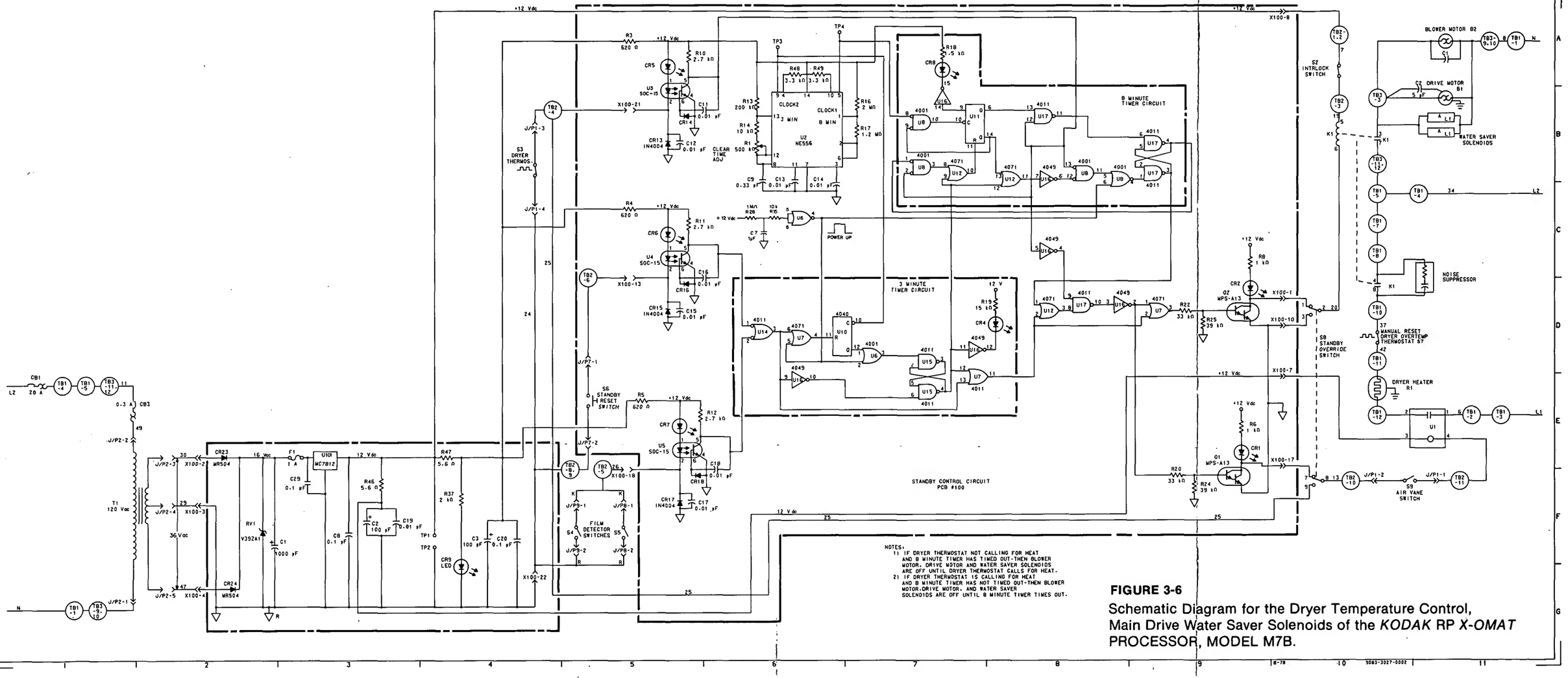


FIGURE 3-6

Schematic Diagram for the Dryer Temperature Control, Main Drive Water Saver Solenoids of the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.

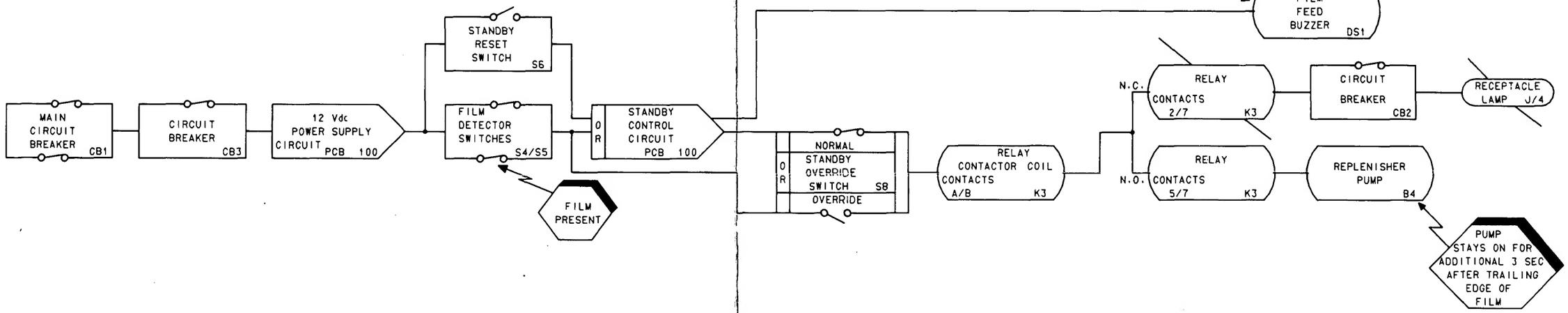


FIGURE 3-7 **Sequence of Operation for the Replenishment Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**

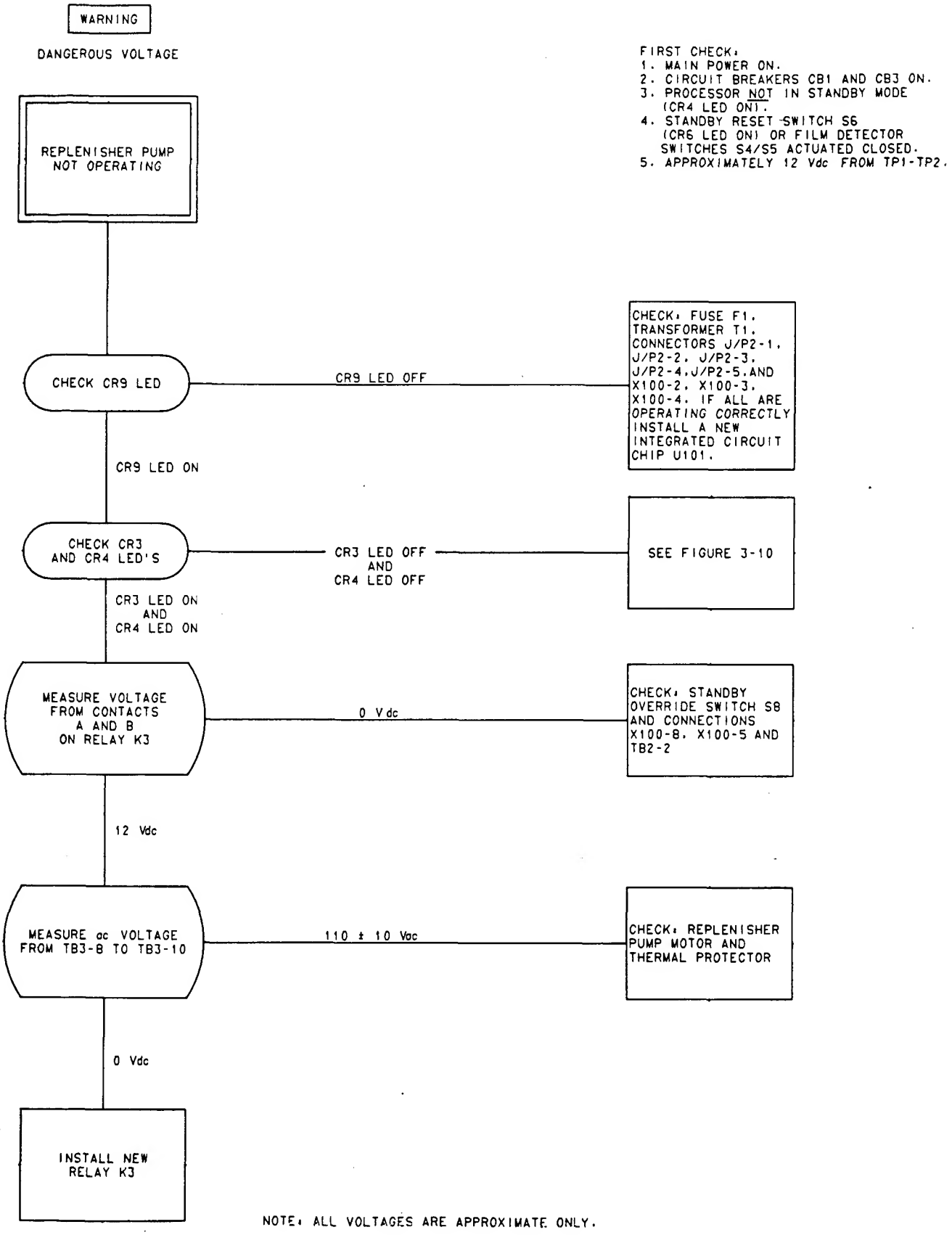

WARNING
DANGEROUS VOLTAGE
FIRST CHECK:
1. MAIN POWER ON.
2. CIRCUIT BREAKERS CB1 AND CB3 ON.
3. PROCESSOR NOT IN STANDBY MODE (CR4 LED ON).
4. STANDBY RESET SWITCH S6 (CR6 LED ON) OR FILM DETECTOR SWITCHES S4/S5 ACTUATED CLOSED.
5. APPROXIMATELY 12 Vdc FROM TP1-TP2.
REPLENISHER PUMP NOT OPERATING
CHECK CR9 LED
CR9 LED OFF
CHECK: FUSE F1, TRANSFORMER T1, CONNECTORS J/P2-1, J/P2-2, J/P2-3, J/P2-4, J/P2-5, AND X100-2, X100-3, X100-4. IF ALL ARE OPERATING CORRECTLY INSTALL A NEW INTEGRATED CIRCUIT CHIP U101.
CR9 LED ON
CHECK CR3 AND CR4 LED'S
CR3 LED OFF AND CR4 LED OFF
SEE FIGURE 3-10
CR3 LED ON AND CR4 LED ON
MEASURE VOLTAGE FROM CONTACTS A AND B ON RELAY K3
0 Vdc
CHECK: STANDBY OVERRIDE SWITCH S8 AND CONNECTIONS X100-8, X100-5 AND TB2-2
12 Vdc
MEASURE ac VOLTAGE FROM TB3-8 TO TB3-10
110 ± 10 Vac
CHECK: REPLENISHER PUMP MOTOR AND THERMAL PROTECTOR
0 Vdc
INSTALL NEW RELAY K3
NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

FIGURE 3-8 **Diagnostic Flowchart for the Replenishment Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**

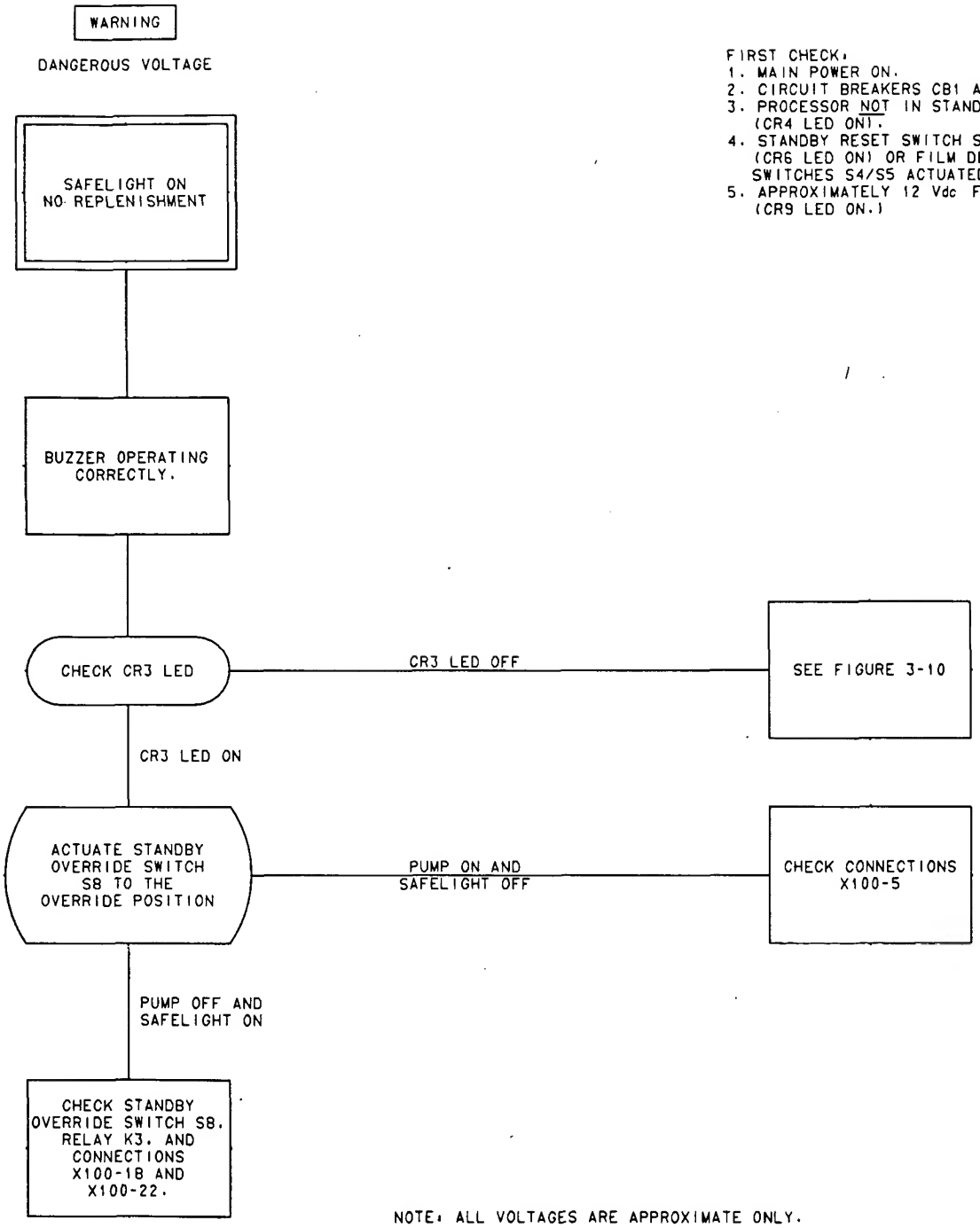

WARNING
DANGEROUS VOLTAGE
FIRST CHECK:
1. MAIN POWER ON.
2. CIRCUIT BREAKERS CB1 AND CB3 ON.
3. PROCESSOR NOT IN STANDBY MODE (CR4 LED ON).
4. STANDBY RESET SWITCH S6 (CR6 LED ON) OR FILM DETECTOR SWITCHES S4/S5 ACTUATED CLOSED.
5. APPROXIMATELY 12 Vdc FROM TP1-TP2. (CR9 LED ON.)
SAFELIGHT ON NO REPLENISHMENT
BUZZER OPERATING CORRECTLY.
CHECK CR3 LED
CR3 LED OFF
SEE FIGURE 3-10
CR3 LED ON
ACTUATE STANDBY OVERRIDE SWITCH S8 TO THE OVERRIDE POSITION
PUMP ON AND SAFELIGHT OFF
CHECK CONNECTIONS X100-5
PUMP OFF AND SAFELIGHT ON
CHECK STANDBY OVERRIDE SWITCH S8, RELAY K3, AND CONNECTIONS X100-18 AND X100-22.
NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

FIGURE 3-9 **Diagnostic Flowchart for the Replenishment Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**

FIRST, CHECK:

1. PROCESSOR NOT IN STANDBY MODE.
2. STANDBY OVERRIDE SWITCH S8 IN NORMAL MODE.

CONDITION	SEE FIGURE
REPLENISHER PUMP NOT OPERATING	3-8
SAFELIGHT ON NO REPLENISHMENT	3-9

SEE FIGURE 3-8 if CR9 LED is OFF.

FILM DETECTOR SWITCHES S4 and S5	POWER SUPPLY CIRCUIT		STANDBY CONTROL CIRCUIT				
			U5		DETECTOR SWITCHES		U5
	TP1-TP2	CR9 LED	PIN 2	CR7 LED	S4	S5	PIN 5
FILM PRESENT	12 V dc	ON	Lo	ON	Actuated closed		Lo
FILM NOT PRESENT	12 V dc	ON	Hi	OFF	Actuated open		Hi

NOTES:

1. Voltages measured to TP2 unless otherwise noted.
2. Voltages measured by a multimeter with an input impedance of 20,000 ohms per volt dc or more.
3. Goes Hi after 3-second time delay, then goes to Lo (one-time pulse).
4. Pumps on for additional 3 seconds after trailing edge of film.
5. Changes state after a 3-second time delay.
6. Changes state after a 3-second time delay for 1 second.
7. Lo = Less than 1V dc
   Hi = Greater than 10V dc

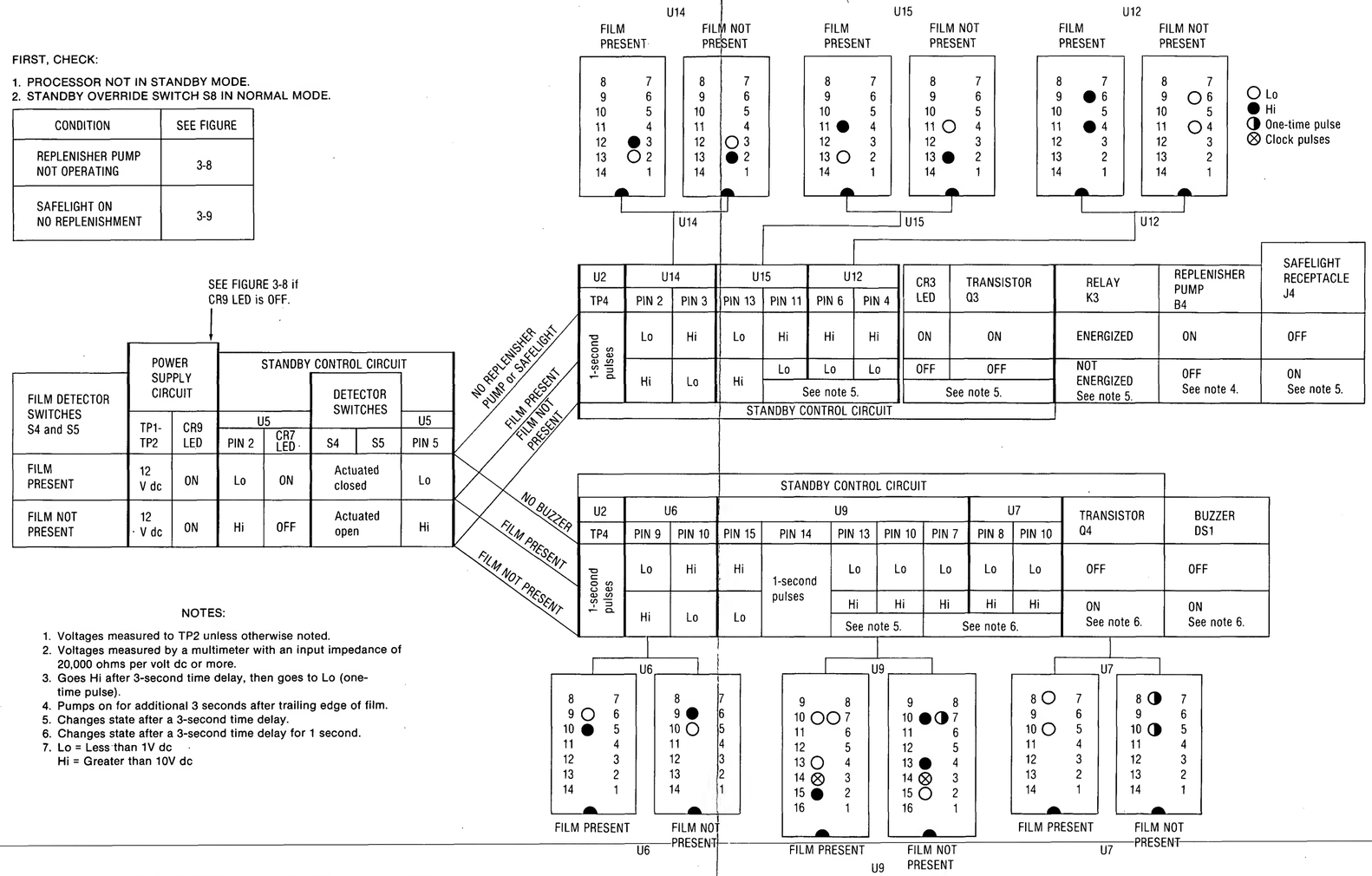

U14
FILM PRESENT
FILM NOT PRESENT
U15
FILM PRESENT
FILM NOT PRESENT
U12
FILM PRESENT
FILM NOT PRESENT
Lo
Hi
One-time pulse
Clock pulses
U14
U15
U12
NO REPLENISHER PUMP or SAFELIGHT
FILM PRESENT
FILM NOT PRESENT
NO BUZZER
FILM PRESENT
FILM NOT PRESENT
U2 | U14 | U15 | U12 | CR3 LED | TRANSISTOR Q3 | RELAY K3 | REPLENISHER PUMP B4 | SAFELIGHT RECEPTACLE J4
TP4 | PIN 2 | PIN 3 | PIN 13 | PIN 11 | PIN 6 | PIN 4
1-second pulses
Lo Hi Lo Hi Hi Hi ON ON ENERGIZED ON OFF
Hi Lo Hi Lo Lo Lo OFF OFF NOT ENERGIZED See note 5. OFF See note 4. ON See note 5.
See note 5. See note 5.
STANDBY CONTROL CIRCUIT
STANDBY CONTROL CIRCUIT
U2 | U6 | U9 | U7 | TRANSISTOR Q4 | BUZZER DS1
TP4 | PIN 9 | PIN 10 | PIN 15 | PIN 14 | PIN 13 | PIN 10 | PIN 7 | PIN 8 | PIN 10
1-second pulses
Lo Hi Hi 1-second pulses Lo Lo Lo Lo Lo OFF OFF
Hi Lo Lo Hi Hi Hi Hi Hi ON See note 6. ON See note 6.
See note 5. See note 6.
U6
FILM PRESENT
FILM NOT PRESENT
U6
U9
FILM PRESENT
FILM NOT PRESENT
U9
U7
FILM PRESENT
FILM NOT PRESENT
U7

FIGURE 3-10 **Circuit Board Flowchart for the Replenishment Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**

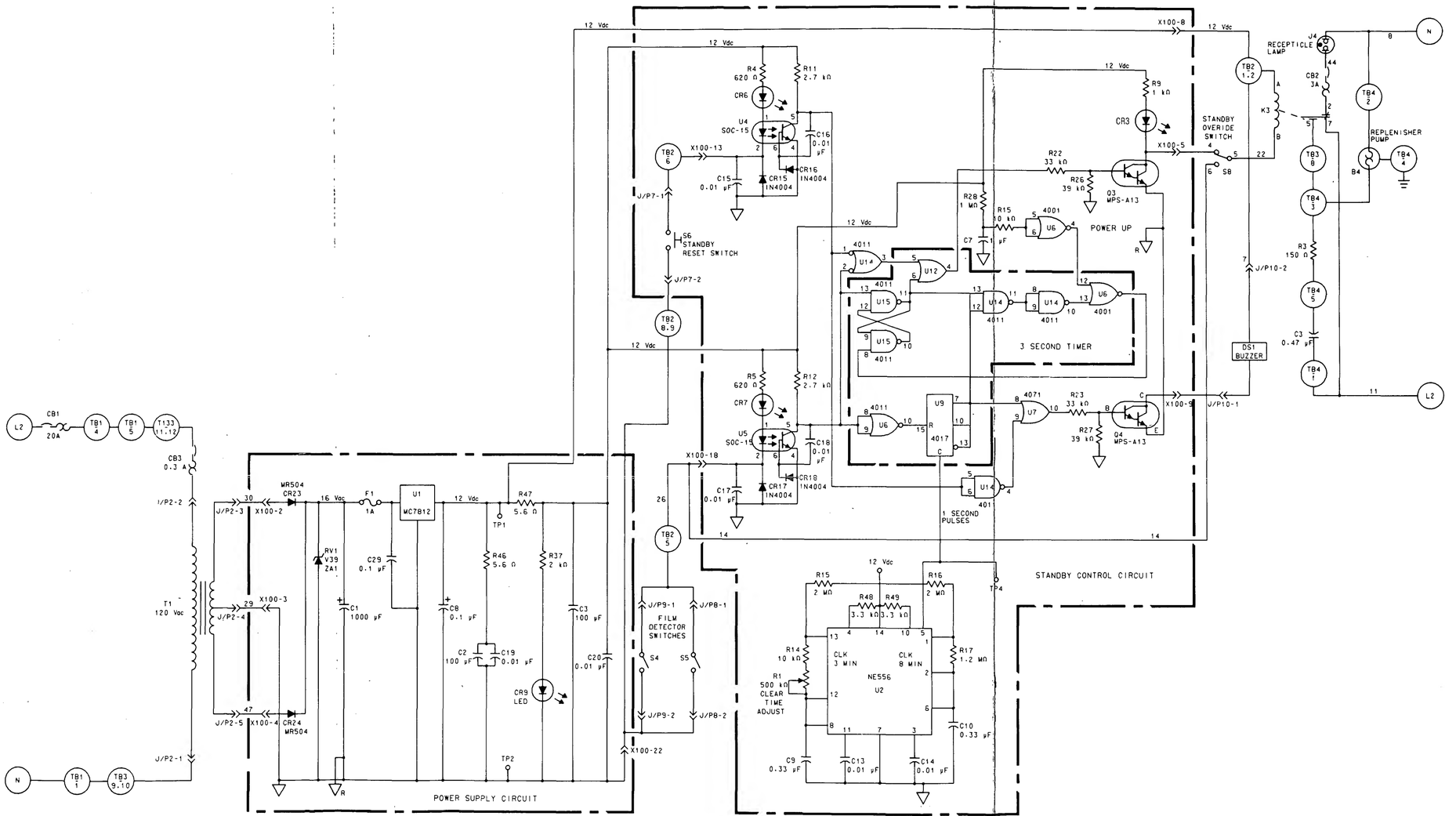


FIGURE 3-11 Schematic Diagram for the Replenishment Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.

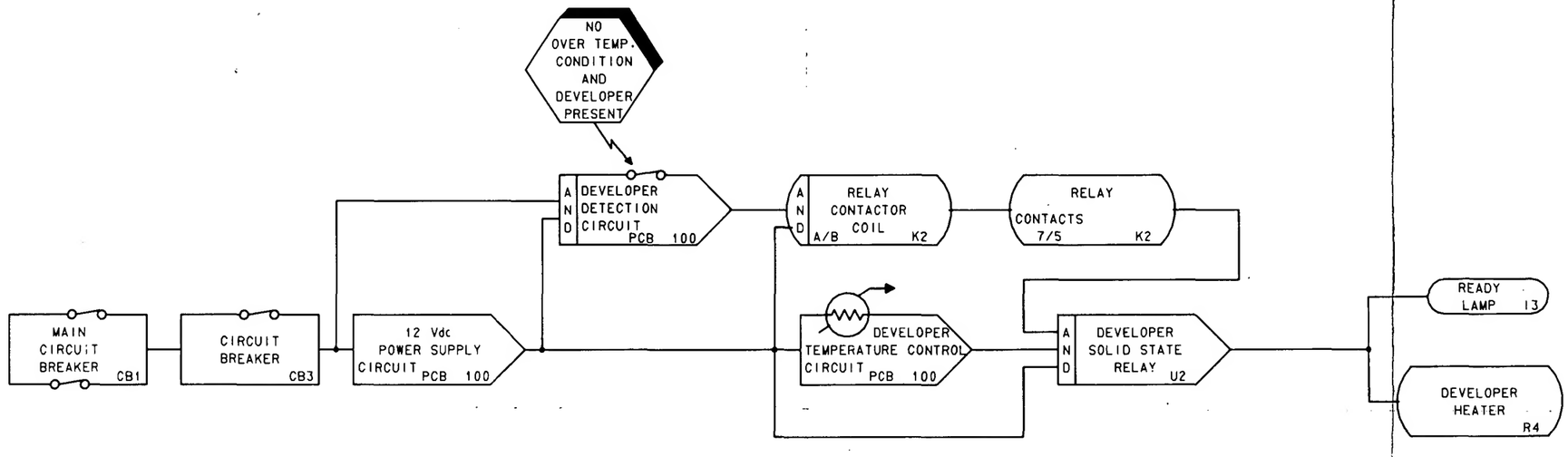
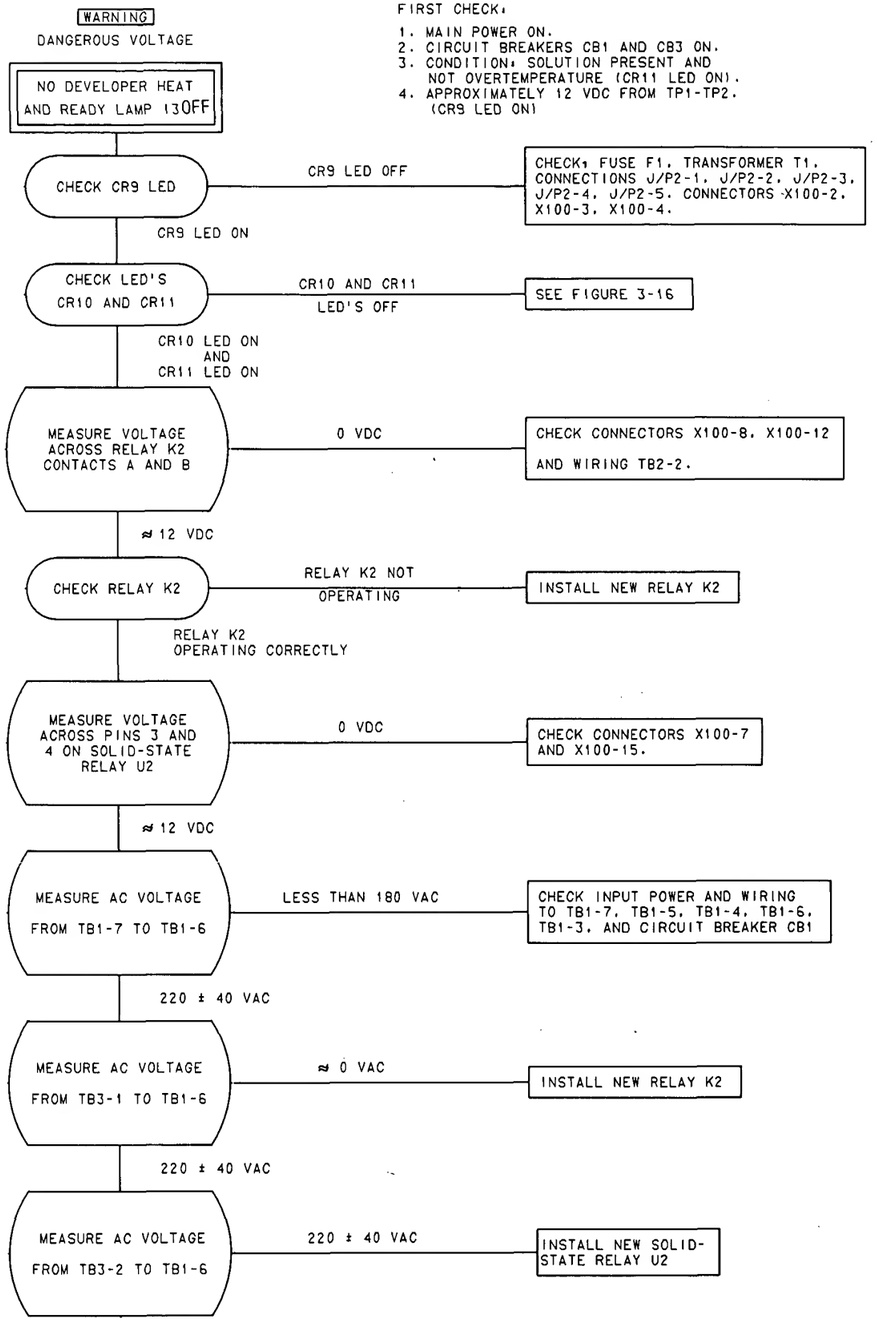


FIGURE 3-12 **Sequence of Operation for the Developer Temperature Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**


WARNING
DANGEROUS VOLTAGE
NO DEVELOPER HEAT AND READY LAMP 130FF
FIRST CHECK:
1. MAIN POWER ON.
2. CIRCUIT BREAKERS CB1 AND CB3 ON.
3. CONDITION: SOLUTION PRESENT AND NOT OVERTEMPERATURE (CR11 LED ON).
4. APPROXIMATELY 12 VDC FROM TP1-TP2. (CR9 LED ON)
CHECK CR9 LED
CR9 LED OFF
CHECK: FUSE F1, TRANSFORMER T1, CONNECTIONS J/P2-1, J/P2-2, J/P2-3, J/P2-4, J/P2-5, CONNECTORS X100-2, X100-3, X100-4.
CR9 LED ON
CHECK LED'S CR10 AND CR11
CR10 AND CR11 LED'S OFF
SEE FIGURE 3-16
CR10 LED ON AND CR11 LED ON
MEASURE VOLTAGE ACROSS RELAY K2 CONTACTS A AND B
0 VDC
CHECK CONNECTORS X100-8, X100-12 AND WIRING TB2-2.
≈ 12 VDC
CHECK RELAY K2
RELAY K2 NOT OPERATING
INSTALL NEW RELAY K2
RELAY K2 OPERATING CORRECTLY
MEASURE VOLTAGE ACROSS PINS 3 AND 4 ON SOLID-STATE RELAY U2
0 VDC
CHECK CONNECTORS X100-7 AND X100-15.
≈ 12 VDC
MEASURE AC VOLTAGE FROM TB1-7 TO TB1-6
LESS THAN 180 VAC
CHECK INPUT POWER AND WIRING TO TB1-7, TB1-5, TB1-4, TB1-6, TB1-3, AND CIRCUIT BREAKER CB1
220 ± 40 VAC
MEASURE AC VOLTAGE FROM TB3-1 TO TB1-6
≈ 0 VAC
INSTALL NEW RELAY K2
220 ± 40 VAC
MEASURE AC VOLTAGE FROM TB3-2 TO TB1-6
220 ± 40 VAC
INSTALL NEW SOLID-STATE RELAY U2

NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

FIGURE 3-13. DIAGNOSTIC FLOWCHART FOR THE DEVELOPER TEMPERATURE CONTROL.

FIGURE 3-13 Diagnostic Flowchart for the Developer Temperature Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.

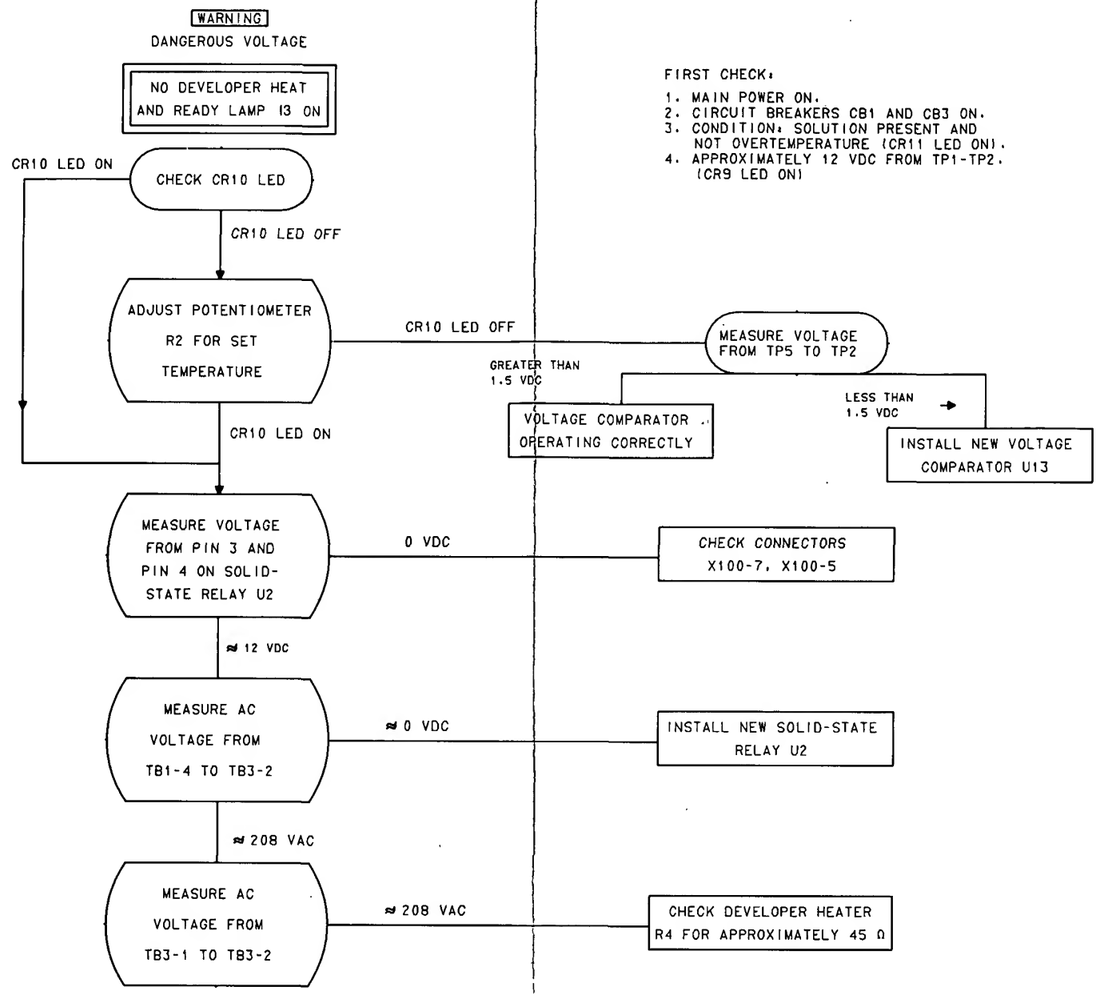
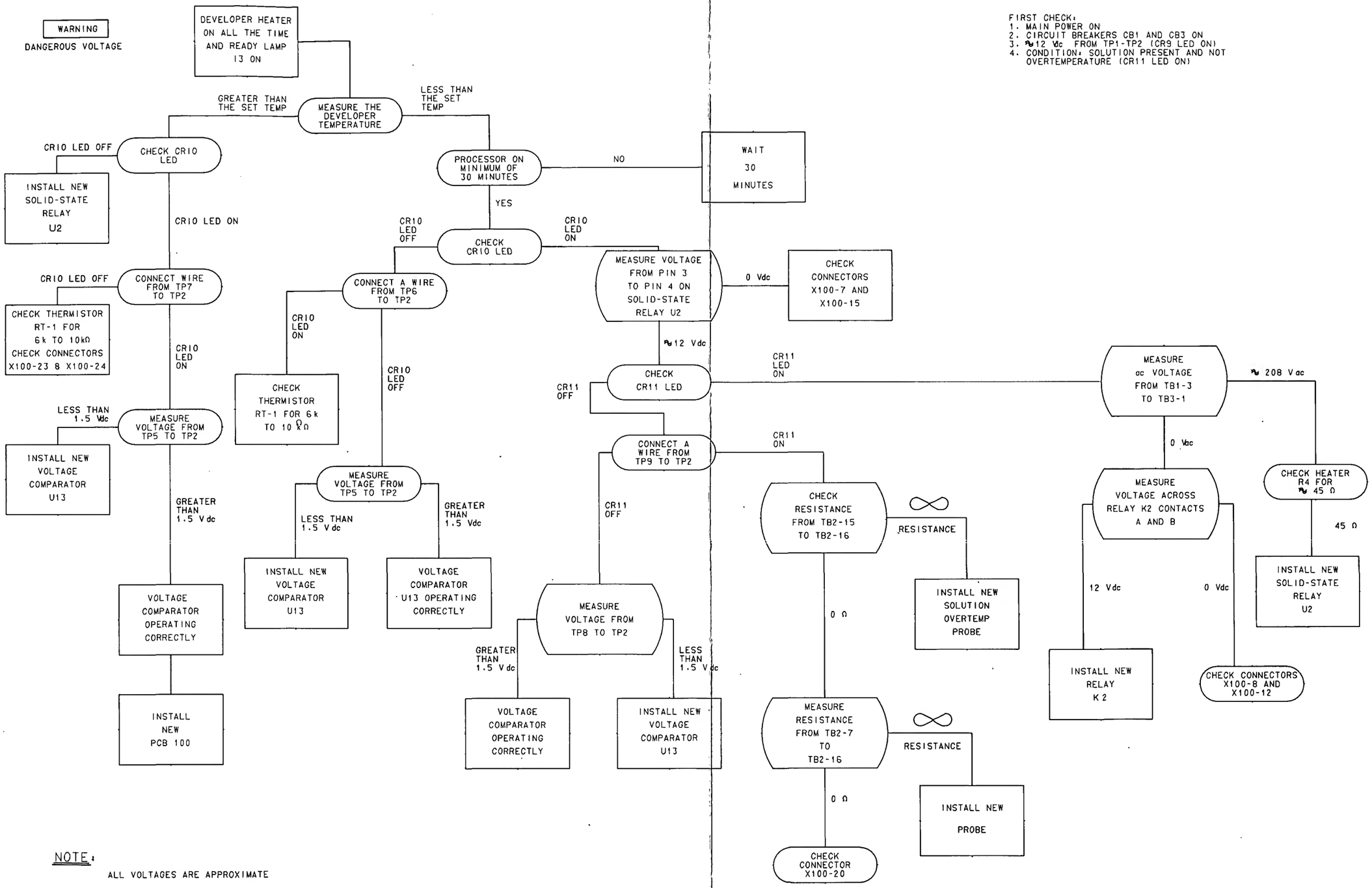

WARNING
DANGEROUS VOLTAGE
NO DEVELOPER HEAT AND READY LAMP 13 ON
CR10 LED ON
CHECK CR10 LED
CR10 LED OFF
ADJUST POTENTIOMETER R2 FOR SET TEMPERATURE
CR10 LED OFF
MEASURE VOLTAGE FROM TP5 TO TP2
GREATER THAN 1.5 VDC
VOLTAGE COMPARATOR OPERATING CORRECTLY
LESS THAN 1.5 VDC
INSTALL NEW VOLTAGE COMPARATOR U13
CR10 LED ON
MEASURE VOLTAGE FROM PIN 3 AND PIN 4 ON SOLID-STATE RELAY U2
0 VDC
CHECK CONNECTORS X100-7, X100-5
≈ 12 VDC
MEASURE AC VOLTAGE FROM TB1-4 TO TB3-2
≈ 0 VDC
INSTALL NEW SOLID-STATE RELAY U2
≈ 208 VAC
MEASURE AC VOLTAGE FROM TB3-1 TO TB3-2
≈ 208 VAC
CHECK DEVELOPER HEATER R4 FOR APPROXIMATELY 45 Ω
FIRST CHECK:
1. MAIN POWER ON.
2. CIRCUIT BREAKERS CB1 AND CB3 ON.
3. CONDITION: SOLUTION PRESENT AND NOT OVERTEMPERATURE (CR11 LED ON).
4. APPROXIMATELY 12 VDC FROM TP1-TP2. (CR9 LED ON)
NOTE: ALL VOLTAGES ARE APPROXIMATE ONLY.

FIGURE 3-14 **Diagnostic Flowchart for the Developer Temperature Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**


WARNING
DANGEROUS VOLTAGE
DEVELOPER HEATER ON ALL THE TIME AND READY LAMP I3 ON
MEASURE THE DEVELOPER TEMPERATURE
GREATER THAN THE SET TEMP
LESS THAN THE SET TEMP
CHECK CRI0 LED
CRI0 LED OFF
INSTALL NEW SOLID-STATE RELAY U2
CRI0 LED ON
CONNECT WIRE FROM TP7 TO TP2
CRI0 LED OFF
CHECK THERMISTOR RT-1 FOR 6k TO 10kΩ CHECK CONNECTORS X100-23 & X100-24
CRI0 LED ON
MEASURE VOLTAGE FROM TP5 TO TP2
LESS THAN 1.5 Vdc
INSTALL NEW VOLTAGE COMPARATOR U13
GREATER THAN 1.5 V dc
VOLTAGE COMPARATOR OPERATING CORRECTLY
INSTALL NEW PCB 100
PROCESSOR ON MINIMUM OF 30 MINUTES
NO
WAIT 30 MINUTES
YES
CHECK CRI0 LED
CRI0 LED OFF
CRI0 LED ON
CONNECT A WIRE FROM TP6 TO TP2
CRI0 LED ON
CHECK THERMISTOR RT-1 FOR 6k TO 10 Ω
CRI0 LED OFF
MEASURE VOLTAGE FROM TP5 TO TP2
LESS THAN 1.5 V dc
INSTALL NEW VOLTAGE COMPARATOR U13
GREATER THAN 1.5 Vdc
VOLTAGE COMPARATOR U13 OPERATING CORRECTLY
MEASURE VOLTAGE FROM TP8 TO TP2
GREATER THAN 1.5 V dc
VOLTAGE COMPARATOR OPERATING CORRECTLY
LESS THAN 1.5 V dc
INSTALL NEW VOLTAGE COMPARATOR U13
MEASURE VOLTAGE FROM PIN 3 TO PIN 4 ON SOLID-STATE RELAY U2
0 Vdc
CHECK CONNECTORS X100-7 AND X100-15
≈12 Vdc
CHECK CR11 LED
CR11 LED ON
CR11 OFF
CONNECT A WIRE FROM TP9 TO TP2
CR11 ON
CR11 OFF
CHECK RESISTANCE FROM TB2-15 TO TB2-16
RESISTANCE
INSTALL NEW SOLUTION OVERTEMP PROBE
0 Ω
MEASURE RESISTANCE FROM TB2-7 TO TB2-16
RESISTANCE
INSTALL NEW PROBE
0 Ω
CHECK CONNECTOR X100-20
FIRST CHECK:
1. MAIN POWER ON
2. CIRCUIT BREAKERS CB1 AND CB3 ON
3. ≈12 Vdc FROM TP1-TP2 (CR9 LED ON)
4. CONDITION: SOLUTION PRESENT AND NOT OVERTEMPERATURE (CR11 LED ON)
MEASURE ac VOLTAGE FROM TB1-3 TO TB3-1
≈ 208 V ac
0 Vac
MEASURE VOLTAGE ACROSS RELAY K2 CONTACTS A AND B
12 Vdc
0 Vdc
INSTALL NEW RELAY K2
CHECK CONNECTORS X100-8 AND X100-12
CHECK HEATER R4 FOR ≈ 45 Ω
45 Ω
INSTALL NEW SOLID-STATE RELAY U2

NOTE:

ALL VOLTAGES ARE APPROXIMATE

FIGURE 3-15 Diagnostic Flowchart for the Developer Temperature Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.

	POWER SUPPLY CIRCUIT		DEVELOPER TEMPERATURE CONTROL CIRCUIT				SOLID-STATE RELAY U2						
			VOLTAGE COMPARATOR U13				Contacts						
DEVELOPER TEMPERATURE	+ – TP1 to TP2	CR10 LED	TP7	TP6	TP5	CR10 LED	4	3	RELAY U2	READY LAMP I3	DEVELOPER HEATER R4	RELAY K2 See note 3.	CR11 LED
			See note 4.										
ROOM TEMPERATURE	12 ± 1/2 V dc	ON	greater than TP6	7 ± 1½ V dc	2 ± 1/2 V dc	ON	Lo	Hi	ENERGIZED	ON	ON	ENERGIZED See note 3.	ON
OPERATING TEMPERATURE	12 ± 1/2 V dc	ON	less than TP6	7 ± 1½ V dc	Less than 0.5 v dc	OFF	Hi	Hi	NOT ENERGIZED	OFF	OFF	NOT ENERGIZED See note 3.	ON

	POWER SUPPLY CIRCUIT		SOLUTION PRESENCE/ OVERTEMPERATURE CIRCUIT				RELAY K2		
			VOLTAGE COMPARATOR U13				Contacts		
SOLUTION PRESENT	+ – TP1 to TP2	CR9 LED	TP10	TP9	TP8	CR11 LED	B	A	RELAY K2
SOLUTION PRESENT and NOT OVER TEMPERATURE	12 ± 1/2 V dc	ON	4 ± 0.7 V dc	less than TP10	2 ± ½ V dc	ON	Lo	Hi	ENERGIZED
NO SOLUTION PRESENT and OVER TEMPERATURE	12 ± 1/2 V dc	ON	4 ± 0.7 V dc	more than TP10	Less than 0.5 V dc	OFF	Hi	Hi	NOT ENERGIZED

CONDITION	SEE FIGURE
NO DEVELOPER HEAT READY LAMP I3 OFF	3-13
NO DEVELOPER HEAT READY LAMP I3 ON	3-14
DEVELOPER HEATER ON ALL THE TIME AND READY LAMP I3 ON	3-15

NOTES:

1. Voltages measured with respect to TP2 unless otherwise noted.
2. Voltages measured by a multimeter with an input impedance of 20,000 ohms per volt dc or more.
3. If Relay K2 is not energized (CR11 LED OFF), check the NO SOLUTION PRESENT and OVERTEMPERATURE section above.
4. Using a multimeter on U13 will result in a false indication, if the voltages at TP6 and TP7 are approximately the same.

FIGURE 3-16 Circuit Board Flowchart for the Developer Temperature Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.

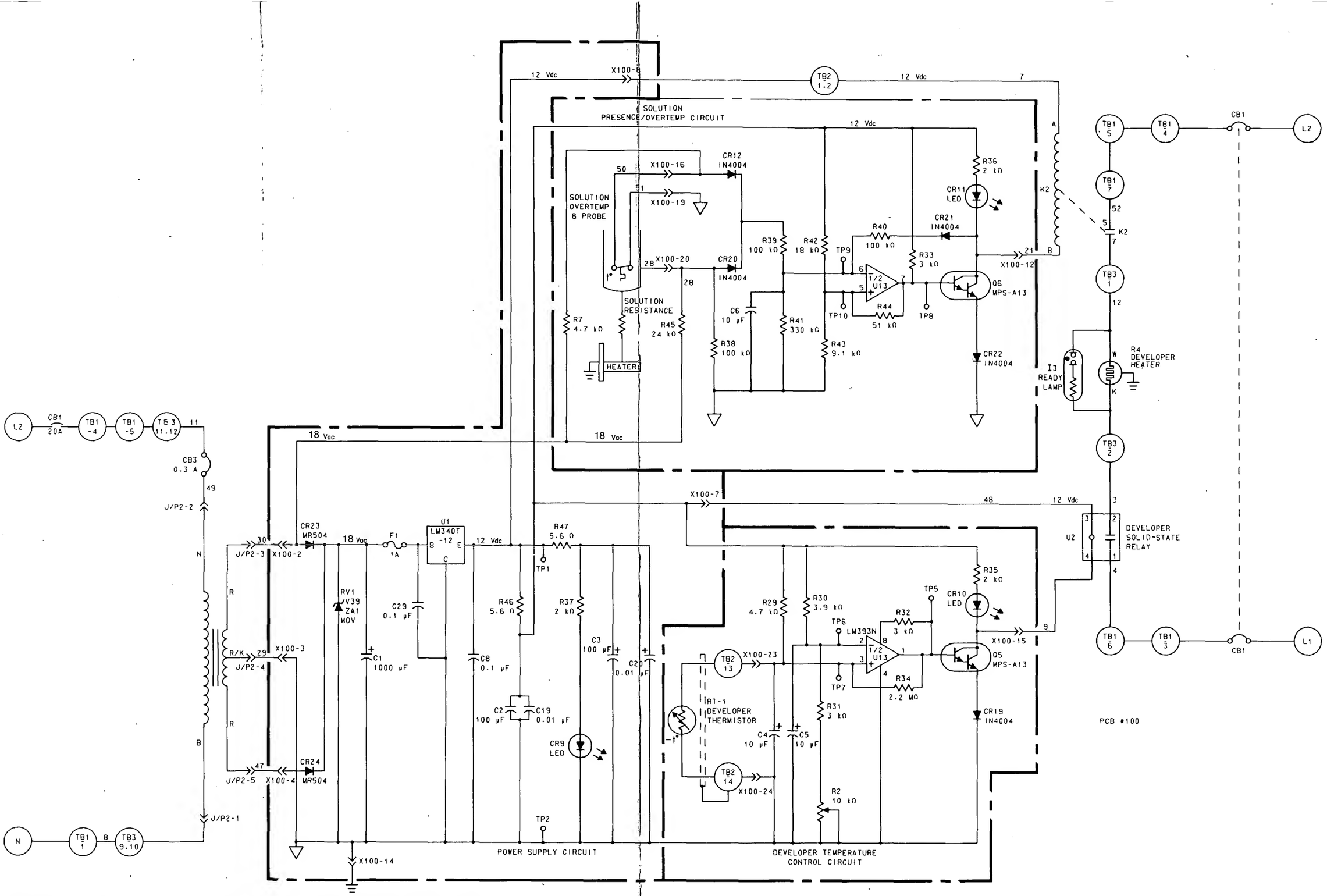


FIGURE 3-17 Schematic Diagram for the Developer Temperature Control System on the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.

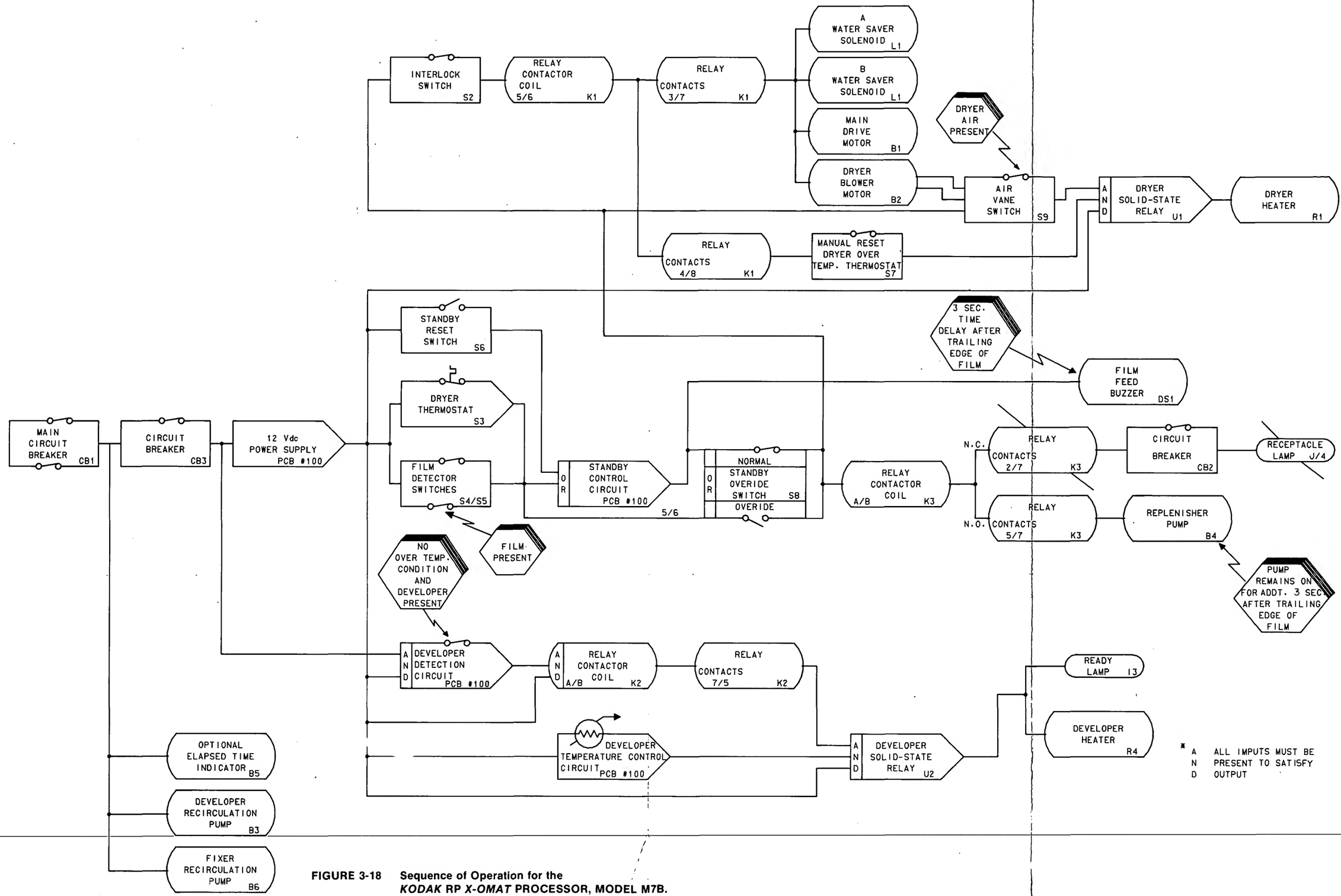


FIGURE 3-18 **Sequence of Operation for the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**

SECTION 4 SERVICE ENGINEERING BULLETINS

Insert all bulletins in this section.

SECTION 5

PERIODIC MAINTENANCE (PM)*

SECTION 5 PERIODIC MAINTENANCE (PM)*

To provide for maximum operation of the PROCESSOR, do the following periodic maintenance when necessary:

1. Provide the lubrication for parts.
2. Clean the parts.
3. Check the condition of parts.
4. Adjust the parts.

Process a number of 35 x 43 cm (14 x 17-inch) films to check film transport through the PROCESSOR.

*This section includes procedures in addition to those in the Operator Checklist.

LUBRICATION CHART

WARNING

Dangerous Voltage

Disconnect the main power before you lubricate the parts.

CAUTION

Do not allow any OIL or GREASE to touch the CROSSOVERS, and RACK ASSEMBLIES or drip into the solution TANKS.

PART	LUBRICANT	FREQUENCY	PROCEDURE
MAIN DRIVE CHAIN	NLGI - No. 2 Lithium Ball and Roller Bearing Grease.*	As necessary Check monthly	Apply to surface of chain.
RECIRCULATION PUMPS	Light oil, such as SAE No. 20 Motor Oil+	Every 6 months.	A number of drops in the oil holes.
MAIN DRIVE MOTOR	No lubrication necessary.		
MAIN DRIVE MOTOR GEAR HOUSING	No lubrication necessary.		
REPLENISHER PUMP MOTOR AND GEAR HEAD	No lubrication necessary.		
DRYER BLOWER MOTOR BEARINGS	No lubrication necessary.		

* Twelve-ounce tubes, Part No. 760614, can be ordered from Eastman Kodak Company, Parts Services, 800 Lee Road, Rochester, New York 14650.

+ One-ounce tube of SAE No. 20 Motor Oil, Part No. 763001, can be ordered from Eastman Kodak Company, Parts Services, 800 Lee Road, Rochester, New York 14650.

DETECTOR CROSSOVER ASSEMBLY

CAUTION

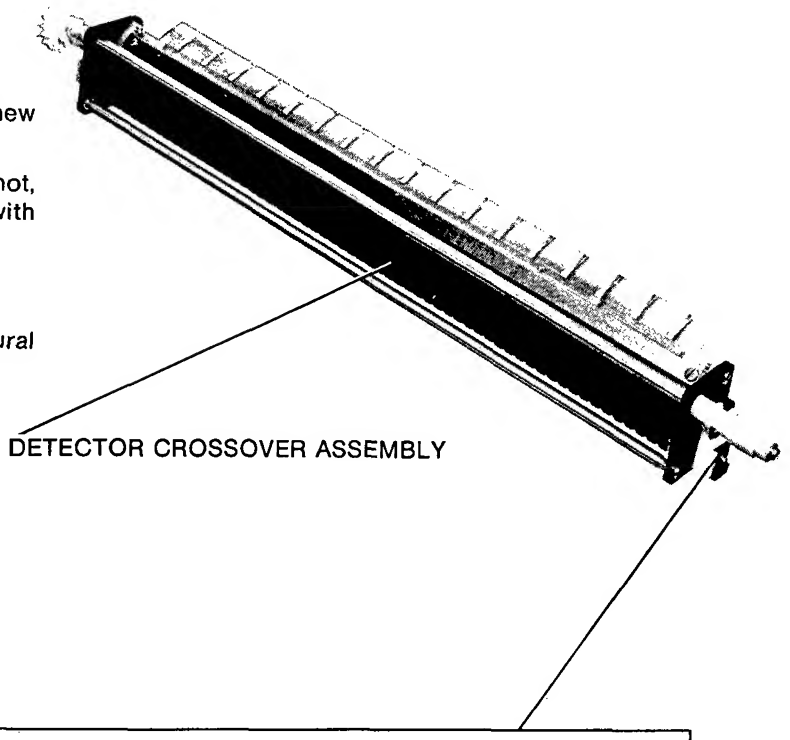
Check that the ASSEMBLY is square and seated correctly when installed.

Adjustment of the ROCKER ARM

- ☐ If the ROCKER ARM has corrosion, install a new one.
- ☐ Check that the ARM moves freely. If it does not, remove the ARM and BUSHING. Clean with warm water and install again.

Cleanliness of the DETECTOR ROLLERS

- ☐ Clean with a damp, lint-free cloth or natural sponge.



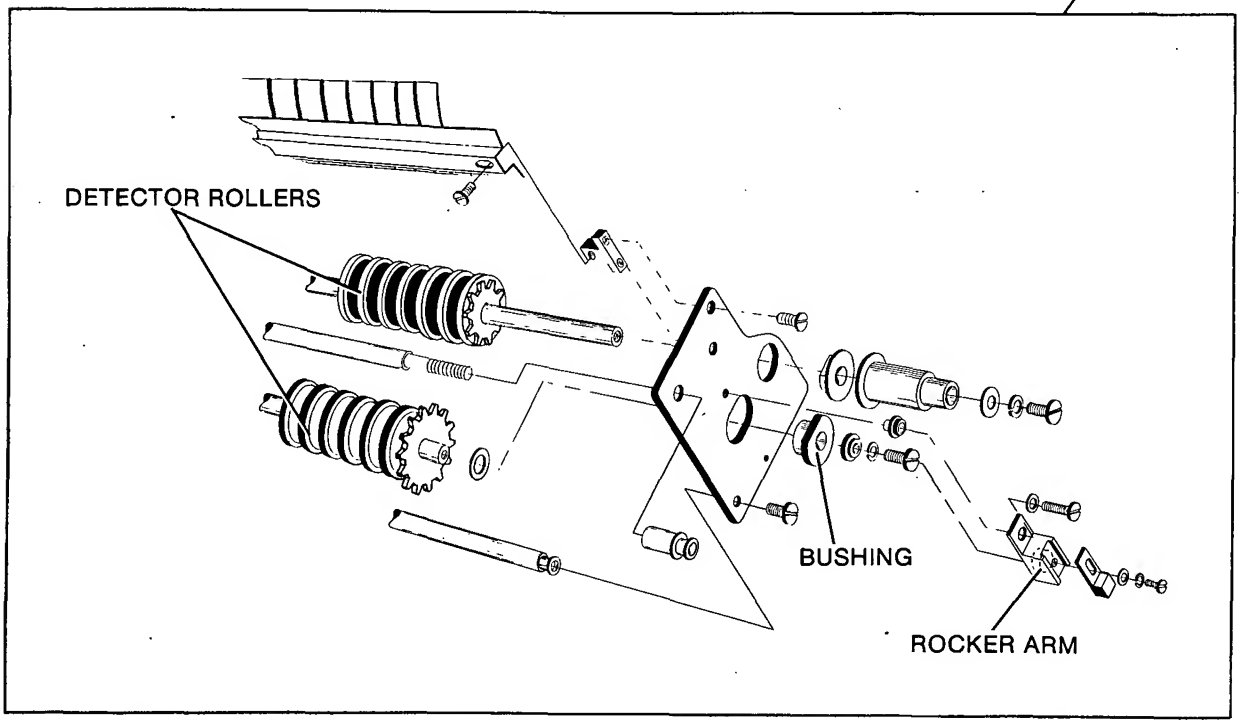


FIGURE 5-1

DETECTOR SWITCH ASSEMBLY (2)

Check that the DETECTOR SWITCHES operate the REPLENISHER PUMP.

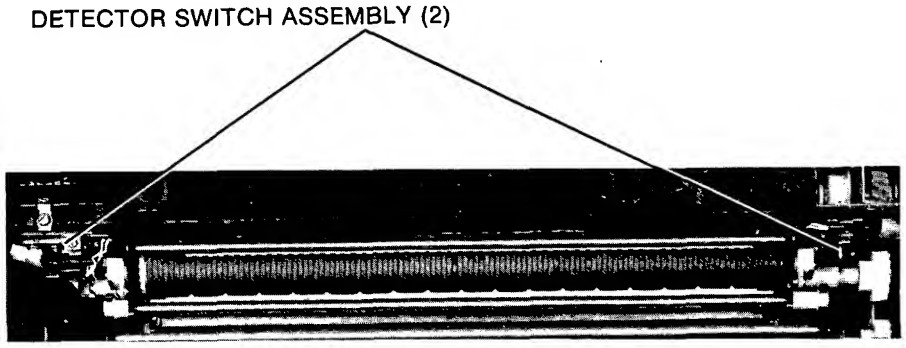


FIGURE 5-2

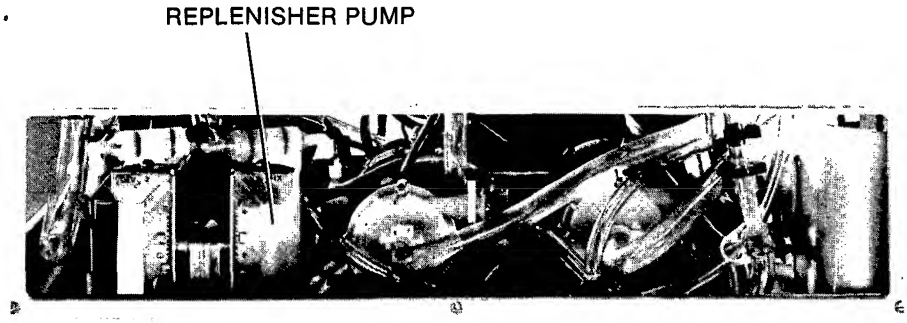


FIGURE 5-3

CROSSOVER ASSEMBLIES

CAUTION

When you remove the ASSEMBLIES from the PROCESSOR, rotate them over on a flat surface so that the GUIDE SHOE ASSEMBLY is up.

Cleanliness

☐ Rinse under running water	☐ If deposits accumulate, use warm water and a soft brush or use:
DEVELOPER-FIXER CROSSOVER ASSEMBLY	*KODAK* DEVELOPER SYSTEM CLEANER or equivalent.
FIXER-WASH CROSSOVER ASSEMBLY	*KODAK* FIXER/WASH SYSTEM CLEANER

Worn Teeth

☐ Check ROLLERS for broken teeth. Install new roller if necessary.

Squareness

☐ Check the ASSEMBLY for squareness by rotating it over on a flat surface.

RESILIENT ROLLER

☐ Check for smoothness and install new ROLLER if necessary.

GUIDE SHOES

☐ When you install, check that the longer TIPS are in the direction of travel. The EXIT GUIDE SHOE is not to touch the INNER TOP ROLLER in the RACK ASSEMBLY.

BEARING, BRACKETS, and NUTS

☐ Check for wear or broken parts and install new ones if necessary.

DRIVE GEAR

☐ Check for wear or burrs, and install new GEAR if necessary.

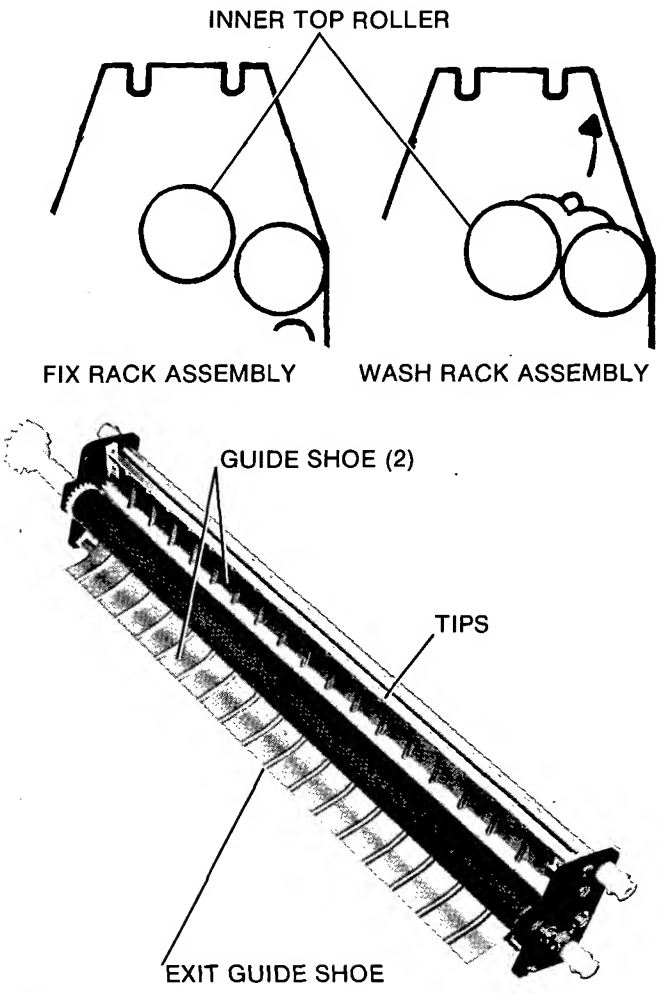


FIGURE 5-4

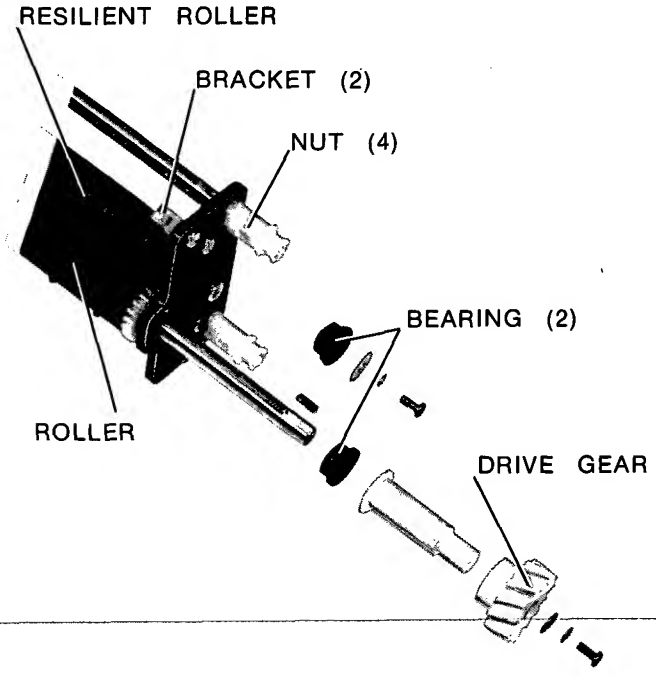


FIGURE 5-5

DRYER ASSEMBLY

ROLLERS

- ☐ Check that all rotate freely with the DRYER DRIVE BELTS removed.
- ☐ Check for broken teeth and install new GEARS if necessary.

DRYER DRIVE BELTS

- ☐ Check for wear and install new BELTS if necessary.
- ☐ Check the tension; adjust the PULLEYS if necessary.

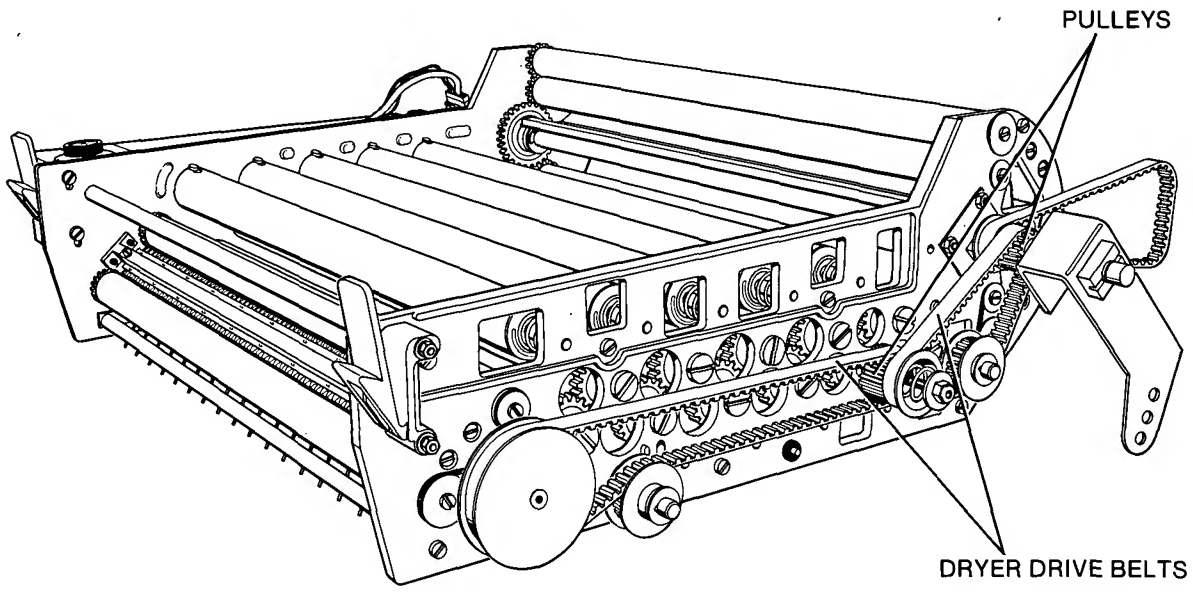


FIGURE 5-6

PULLEY ASSEMBLIES

- ☐ Check the PULLEY BEARINGS for wear.

AIR TUBES

- ☐ Remove any dirt or dust.

AIR TUBE SPRINGS

- ☐ Check for wear and install new SPRINGS if necessary.

GUIDE PINS

- ☐ Check the alignment.
- ☐ Remove any burrs from the TIPS.

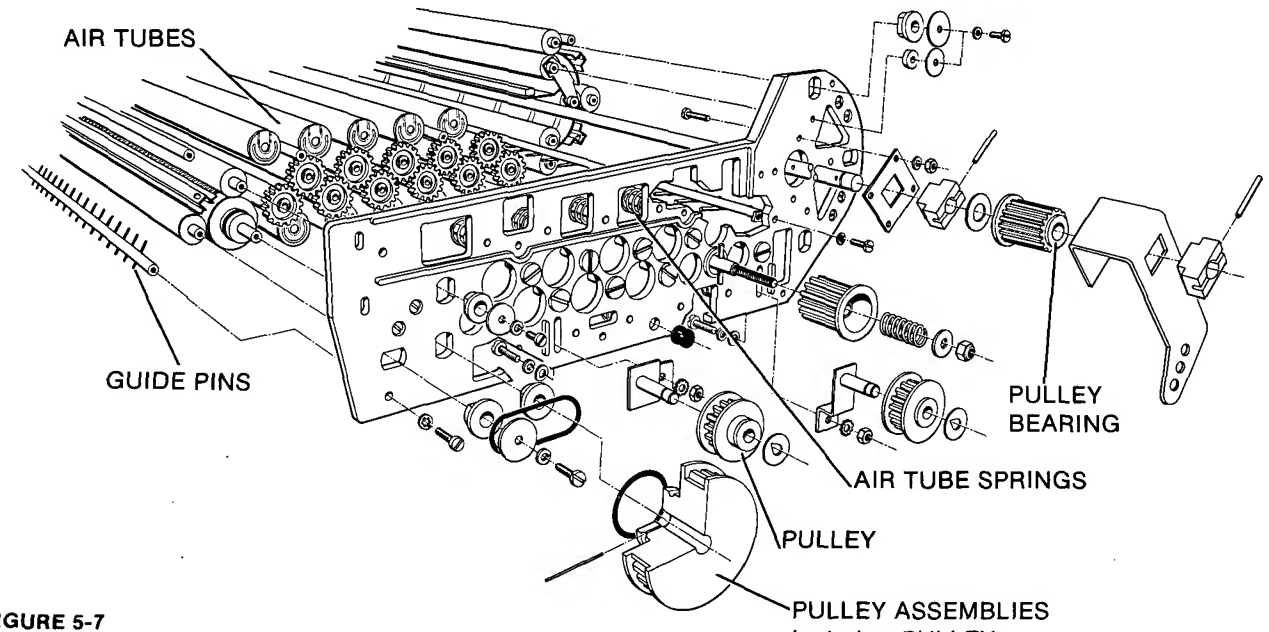


FIGURE 5-7

DRYER ASSEMBLY (Continued)

GUIDE SHOES

☐ Check that the TIPS do not hit ROLLERS or film.

GUIDE SHOE BRACKETS

☐ Check for broken parts and install new ones if necessary.

☐ Check for stripped SCREW holes.

GEARS

☐ Check for wear or burrs. Install new GEARS if necessary.

PLATE SPRINGS

☐ Check for wear and install new ones if necessary.

☐ Check that the PLATE SPRINGS are not too tight.

AIR VANE SWITCH S9

☐ Check that the flow of air in the DRYER actuates the SWITCH.

☐ Remove the SWITCH and check for mechanical binds. Install a new SWITCH if necessary.

DRYER THERMOSTAT

☐ Check the setting. The temperature range is dependent upon ambient conditions.

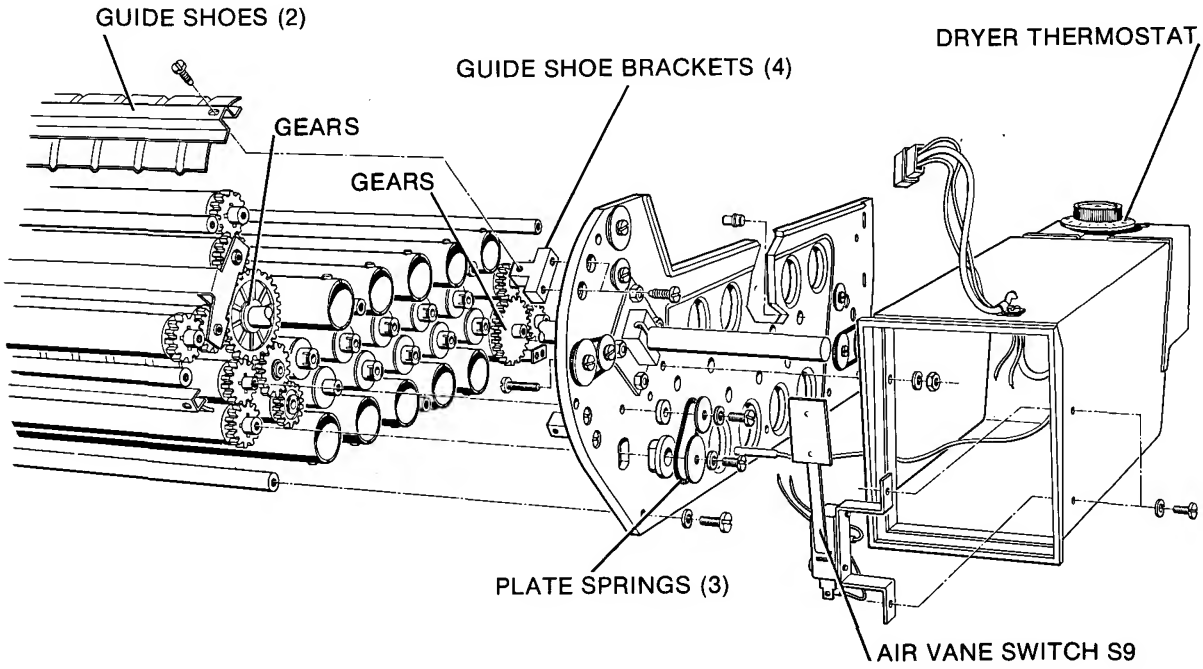


FIGURE 5-8

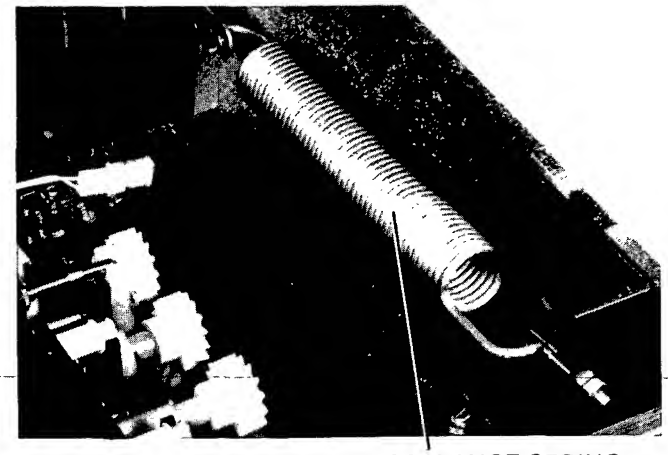


FIGURE 5-9

CAUTION

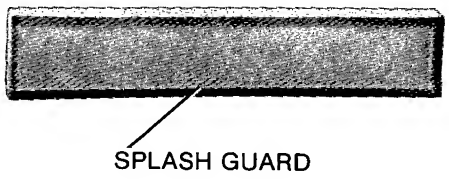
Do not overtighten the SPRING.

☐ Adjust the tension so that the SPRING holds the DRYER up when the PROCESSOR is open.

RACK ASSEMBLIES

CAUTION

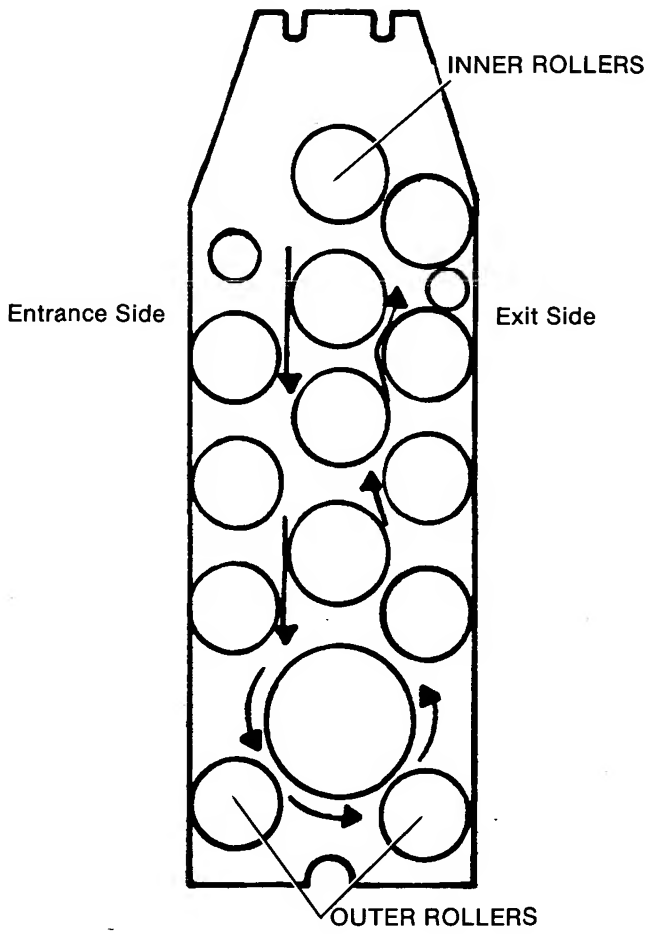
When you remove the FIXER RACK ASSEMBLY, install a SPLASH GUARD between the DEVELOPER and FIXER TANKS to prevent fixer from contaminating the developer. Use a DRIP TRAY when removing the RACK ASSEMBLIES.



Cleanliness

☐ Rinse with warm water - approximately 43.5°C (110°F).	☐ Discoloration of the rollers is normal. Remove any deposits with warm water and a brush or use:
DEVELOPER RACK ASSEMBLY	*KODAK* DEVELOPER SYSTEM CLEANER, or equivalent.
FIXER BACK ASSEMBLY	*KODAK* FIXER/WASH SYSTEM CLEANER or equivalent.
WASH RACK ASSEMBLY	If the ROLLERS are slimy: *KODAK* FIXER/WASH SYSTEM CLEANER, or equivalent.

For example only:



- ☐ To clean the INNER ROLLERS, remove all OUTER ROLLERS on the entrance side except the bottom one. Remove the STUDS and NUTS from the drive side.
- ☐ Check all SPROCKETS and GEARS for wear.
- ☐ Check all ROLLERS visually for unusual warping and bow.
- ☐ Check that the RACK is square and the ROLLERS are in their correct configuration.

FIGURE 5-10 DEVELOPER RACK ASSEMBLY

CHAIN

- ☐ Check the CHAIN LINKS. Manually rotate the DRIVE GEAR so that the entire length of the CHAIN passes over the DRIVE SPROCKET.
- ☐ Check the CHAIN tension:

  Too tight a CHAIN - ROLLERS bind; wear on the BEARING.

  Too loose a CHAIN - prevents ROLLERS from moving smoothly.
- ☐ Adjust the CHAIN by moving the TURNAROUND up or down.

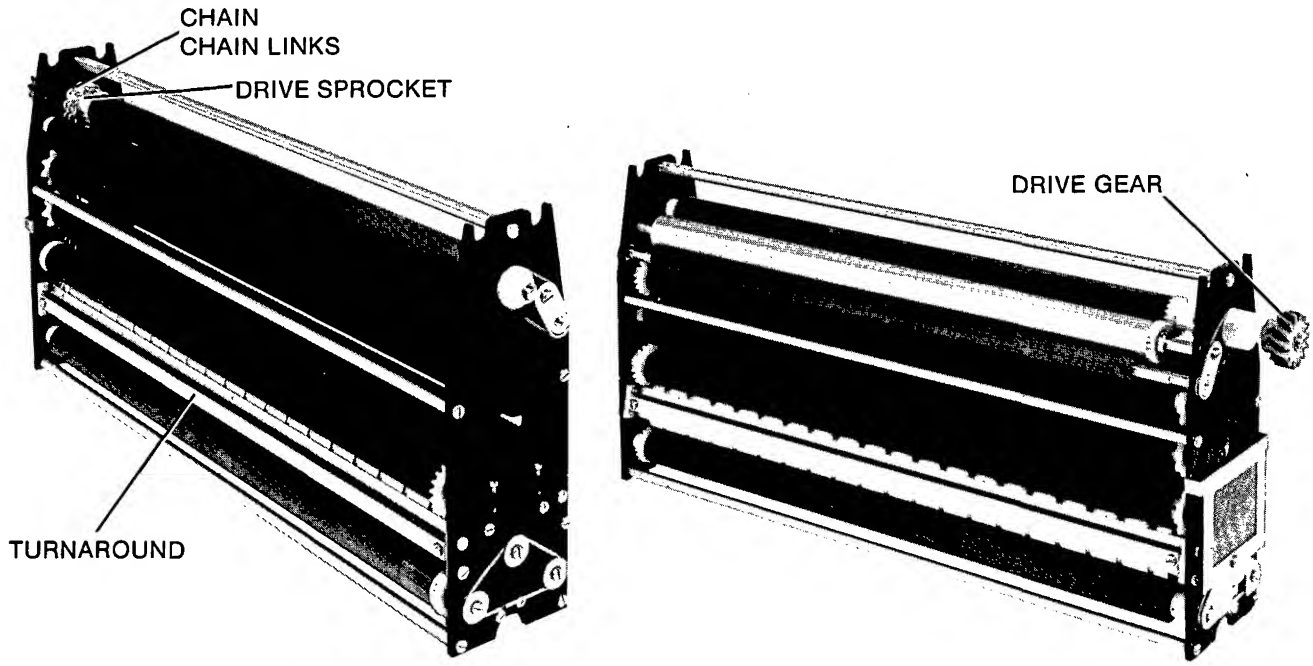


FIGURE 5-11 DEVELOPER RACK ASSEMBLY

SPRINGS

- ☐ Check for wear. Install new SPRINGS if necessary.

REWET ROLLER

- ☐ Check for wear.
- ☐ ROLLER is to touch the ROLLERS above and below it.

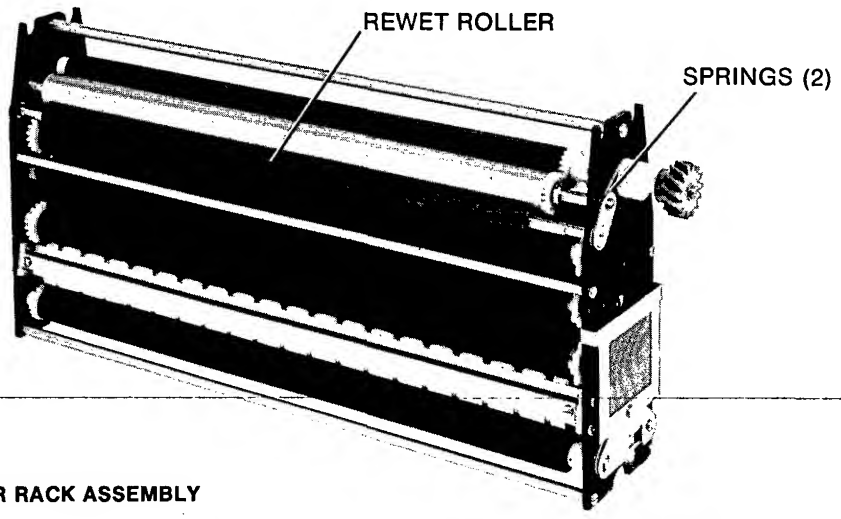


FIGURE 5-12 DEVELOPER RACK ASSEMBLY

- ☐ To remove deposits from the DEVELOPER TURNAROUND ASSEMBLY, use: *KODAK* DEVELOPER SYSTEM CLEANER, or equivalent.
- ☐ To remove deposits from the FIXER and WASH TURNAROUND ASSEMBLY, use: *KODAK* FIXER/WASH SYSTEM CLEANER, or equivalent.

SPRINGS

- ☐ Check the tension.

ROLLERS

- ☐ Check that the ROLLER ASSEMBLY moves freely in the slots of the locating PLATE.
- ☐ Check the BEARINGS. ROLLERS should rotate freely on the SHAFT.
- ☐ Check that the ROLLERS are not too loose. Check that the surface of the ROLLERS is smooth.

Cleanliness

- ☐ Wipe all the ROLLERS with a damp cloth or sponge.

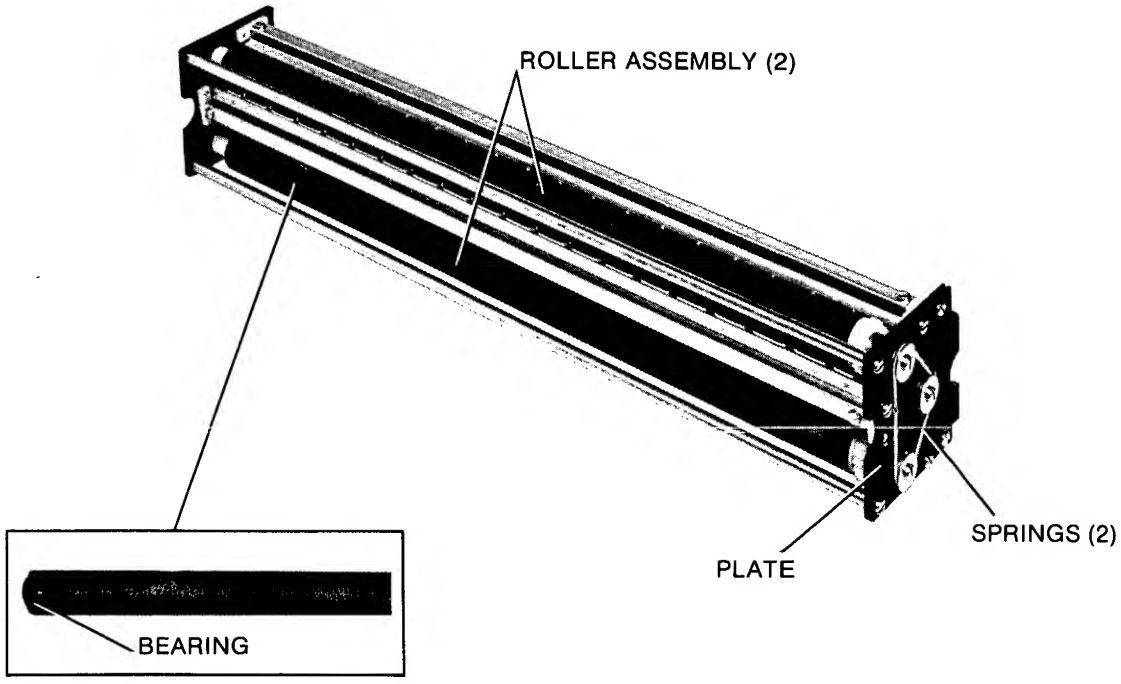


FIGURE 5-13 TURNAROUND ASSEMBLY

MAIN DRIVE AND DRYER DRIVE BELTS

CHAIN

- ☐ Check for wear.
- ☐ Check the tension. If adjustment is necessary, align the MOTOR SPROCKET with the MAIN DRIVE SPROCKET.
- ☐ Lubricate if necessary.

BEARINGS, SPROCKETS, AND WORM GEARS

- ☐ Check for wear, and install new ones if necessary.
- ☐ Install new SPROCKETS if the teeth have sharp edges.
- ☐ Check the WORM GEARS for burrs.
- ☐ Rinse the WORM GEARS with a small amount of warm water.
- ☐ Lubricate only the BEARINGS and SPROCKETS if necessary.....do NOT lubricate the WORM GEARS.

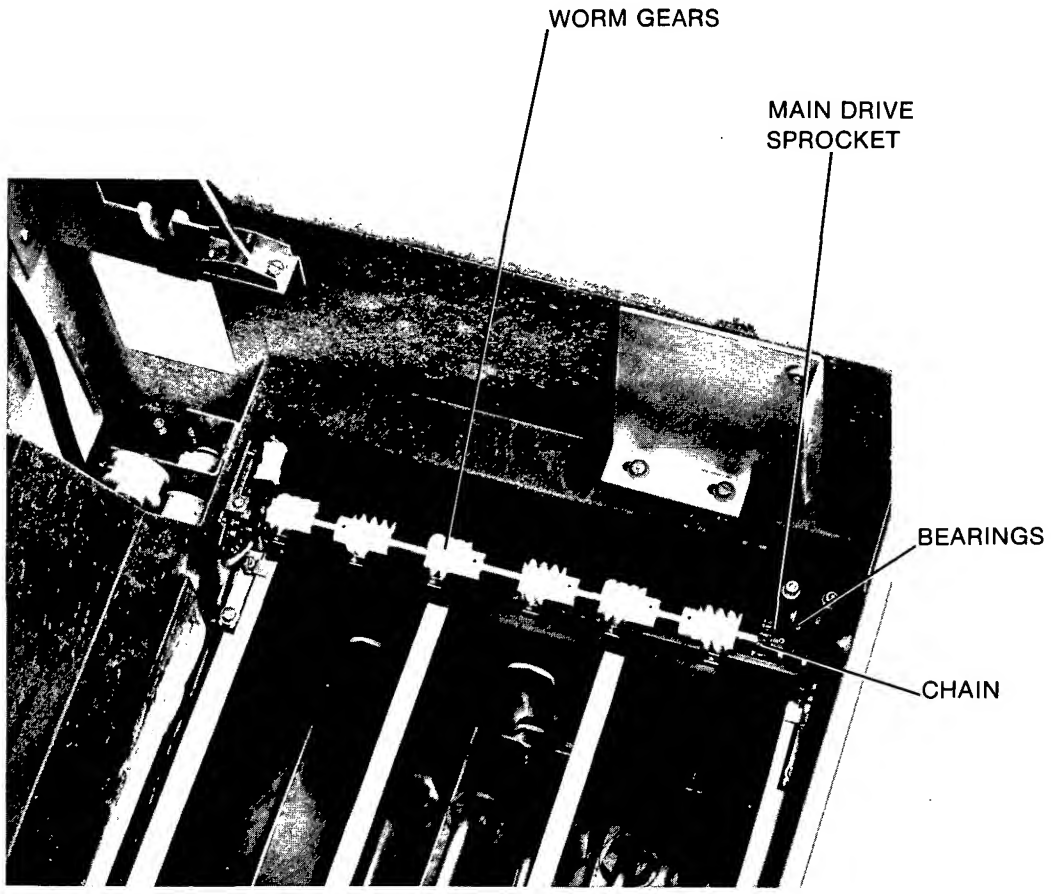


FIGURE 5-14

(R) PLUMBING CONNECTIONS

☐ Visually check all PUMP, VALVE, TUBING, and TANK connections for leakage.

Water

☐ Check the incoming water temperature: 4.5-26.5° C (40-80° F)

☐ To check the wash water rate:

1. Drain the TANK.
2. With the WASH RACK installed, insert the WEIR and open the WATER VALVE to the maximum position.

For Serial No. 16000 processors and lower without Modification No. 3:
The TANK will fill to overflow in 85 seconds.

Flow rate: 5.7 litres/min
1½ gal/min

For Serial No. 16001 and above processors or 16000 and lower with Modification No. 3:
The TANK will fill to overflow in 2.5 minutes.

Flow rate: 3.8 litres/min
1 gal/min

☐ Check the incoming water supply and/or WATER SOLENOID AND FLOW CONTROL VALVE.

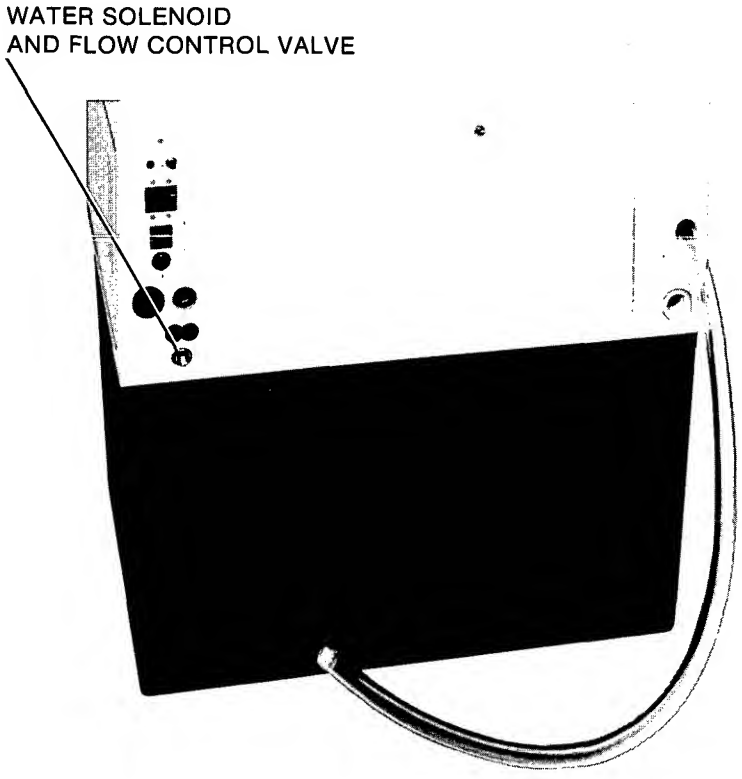


FIGURE 5-15

RECIRCULATION

RECIRCULATION PUMPS (see Figure 5-17)

☐ Actuate the PUMPS and check the agitation on the surface of the solutions.

NOTE

Always use the DRIP TRAY and the SPLASH GUARD when removing RACK ASSEMBLIES.

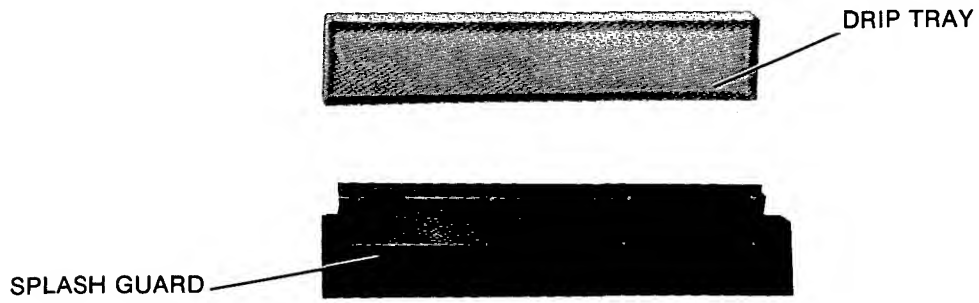


FIGURE 5-16

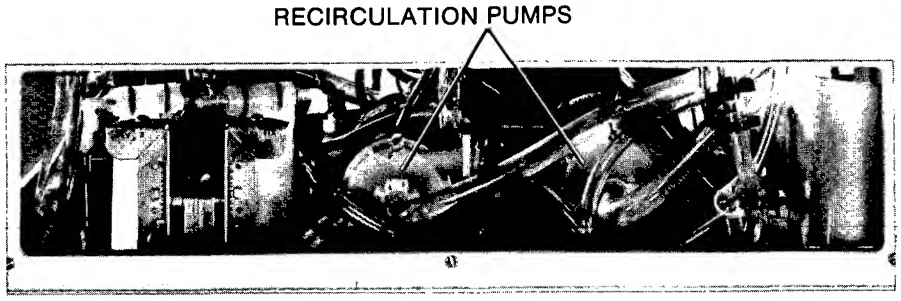


FIGURE 5-17

☐ Check the IMPELLER and SHAFT for cleanliness or wear. If there is no recirculation, check that the PUMP is operating. If the PUMP is not operating, see the Wiring Diagram.

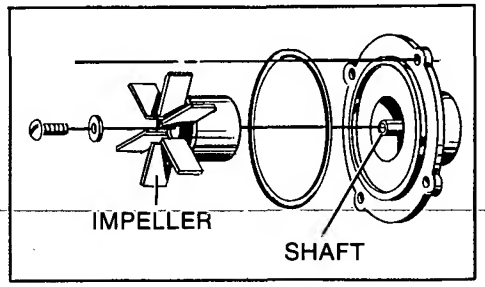


FIGURE 5-18

Developer

☐ Remove the DEVELOPER-FIXER CROSSOVER, actuate the PUMPS, and check agitation on the srface of the solutions.

Fixer

☐ Remove the FIXER-WASH CROSSOVER, actuate the PUMPS, and check the agitation on the surface of the solutions.

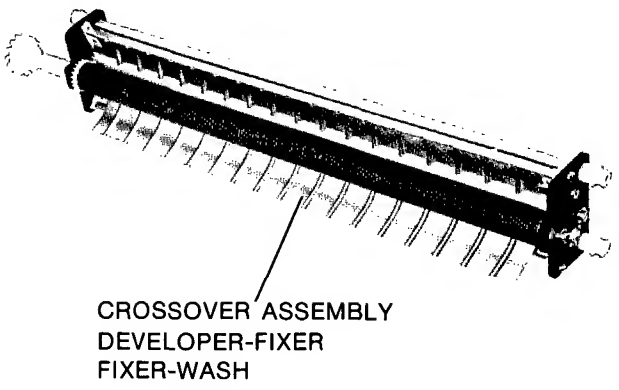


FIGURE 5-19

☐ Install a new FILTER at least once a month or after feeding approximately 5,000 films.

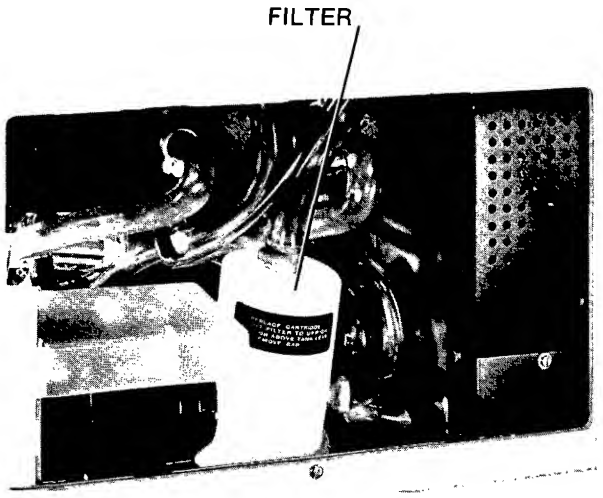


FIGURE 5-20

☐ With a THERMOMETER of known accuracy, check the developer solution in the processing tanks. Adjust POTENTIOMETER R2 if necessary.

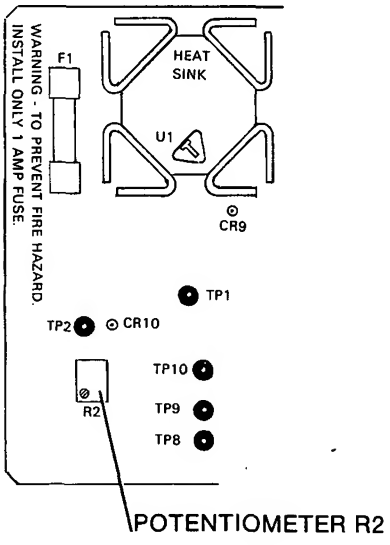


FIGURE 5-21

(R) CHEMICAL REPLENISHMENT

- ☐ Check the mixing of replenishment solution. Use the instructions included with the chemicals.
- ☐ To check the replenishment rates, see the Service Data, Section 2, Figure 2-9.

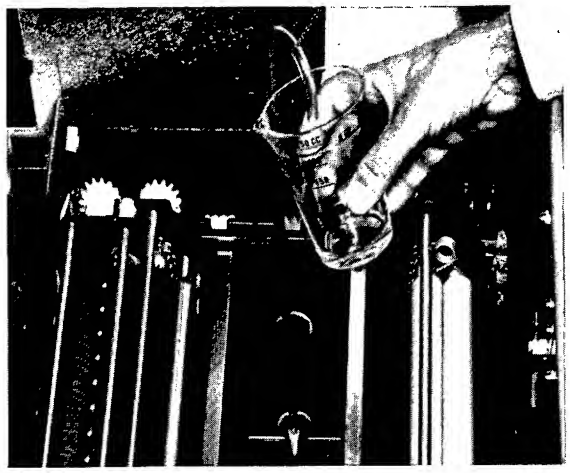


FIGURE 5-22

- ☐ "READY" LIGHT

  On = developer below the correct operating temperature.

  Flickering = within ±0.2°C (±0.3°F) of the correct temperature.

  Off = developer above the correct operating temperature.

Fixer

- ☐ When new solutions are added, clean the system with warm water.

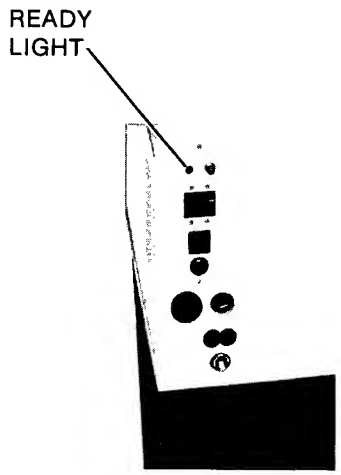


FIGURE 5-23

(R) ELECTRICAL

Automatic Standby Control

- ☐ Check that the processor goes into the standby cycle after reaching the operating temperature. The DRIVE MOTOR, DRYER BLOWER, and DRYER HEATER will cycle on and off.
- ☐ Feed a sheet of film. Check the clear mode. Approximately 3 minutes after the film leaves the DETECTOR CROSSOVER ASSEMBLY (and the DRYER is at operating temperature), the processor will go in the standby mode.

NOTE

The PUMP operates for an additional 4 seconds after the DETECTOR SWITCHES de-energize.

WARNING

Dangerous Voltage

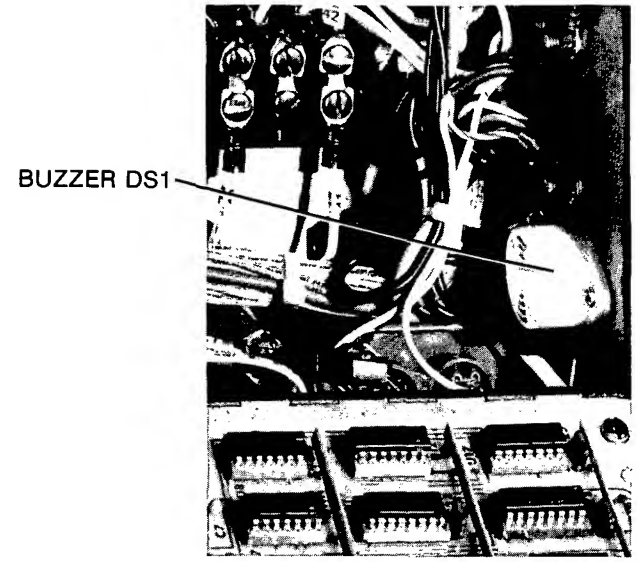
Before you do any adjustment, installation, and/or removal of any electrical parts, DISCONNECT THE MAIN POWER. Electrical adjustments are to be made by qualified personnel only.

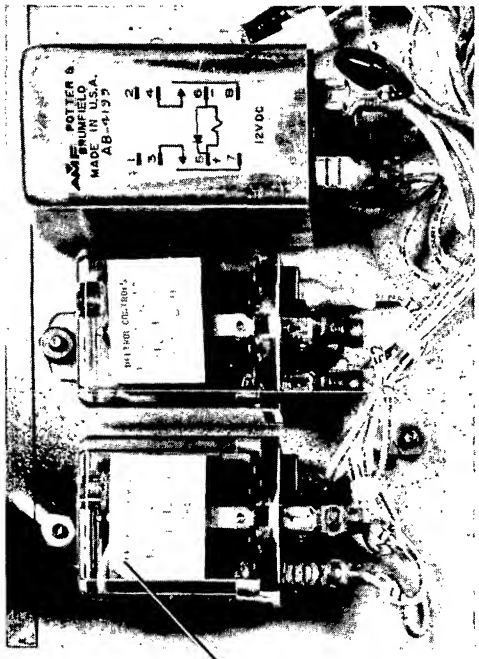
Time-Delay Circuit

- ☐ Check the operation. Momentarily actuate either of the DETECTOR SWITCHES. Film-feed signal buzzer will sound approximately 4 seconds after the DETECTOR SWITCH de-energizes. If the BUZZER DS1 does not sound, check the Diagnostic Procedures in Section 3.

Safelight

- ☐ Check the operation of the SAFELIGHT. If the SAFELIGHT is not operating correctly, check the RELAY K3.





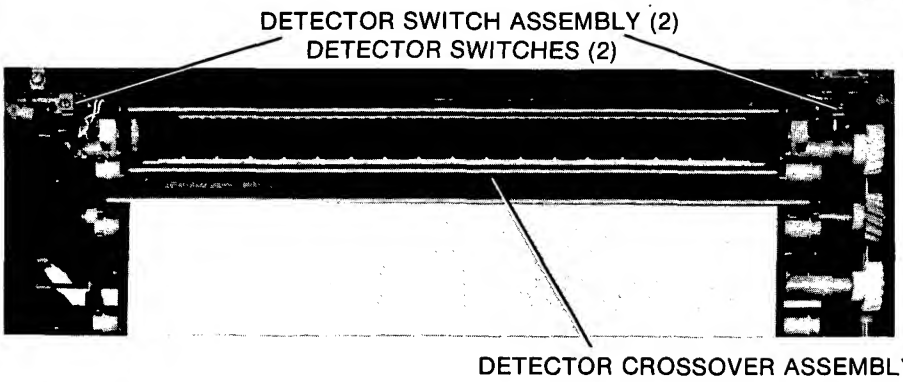


FIGURE 5-24

SECTION 6 MODIFICATIONS

Insert all MODIFICATION INSTRUCTIONS in this section.

SECTION 7 DIAGRAMS

Figure	Title	Page
7-1	Wiring Diagram for the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B	7-2
7-2	Circuit Diagram for the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B	7-3
7-3	Circuit Diagram for the 100 PCB of the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B, Sheet 1 of 2	7-5
7-4	Circuit Diagram for the 100 PCB of the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B, Sheet 2 of 2	7-7

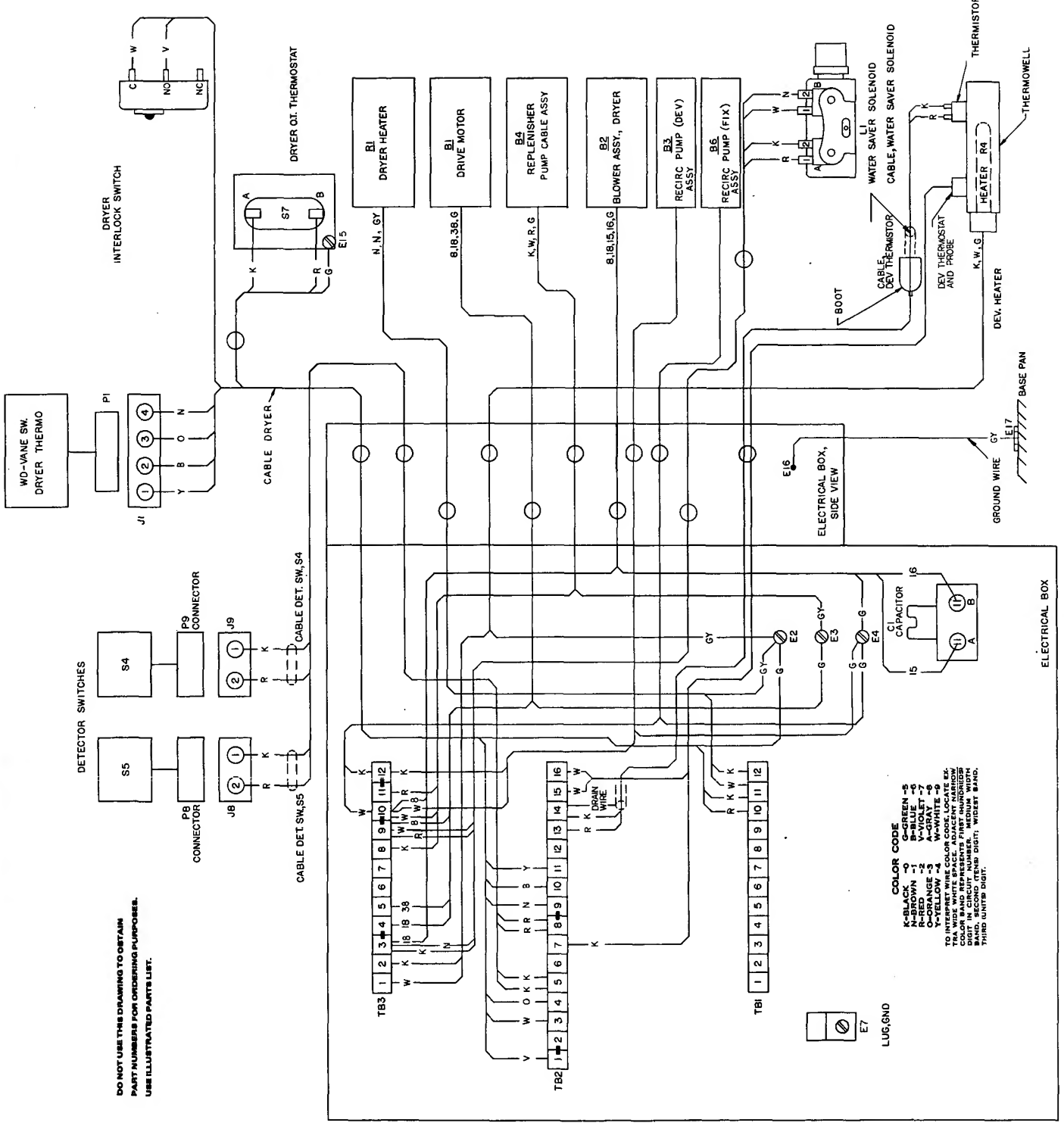
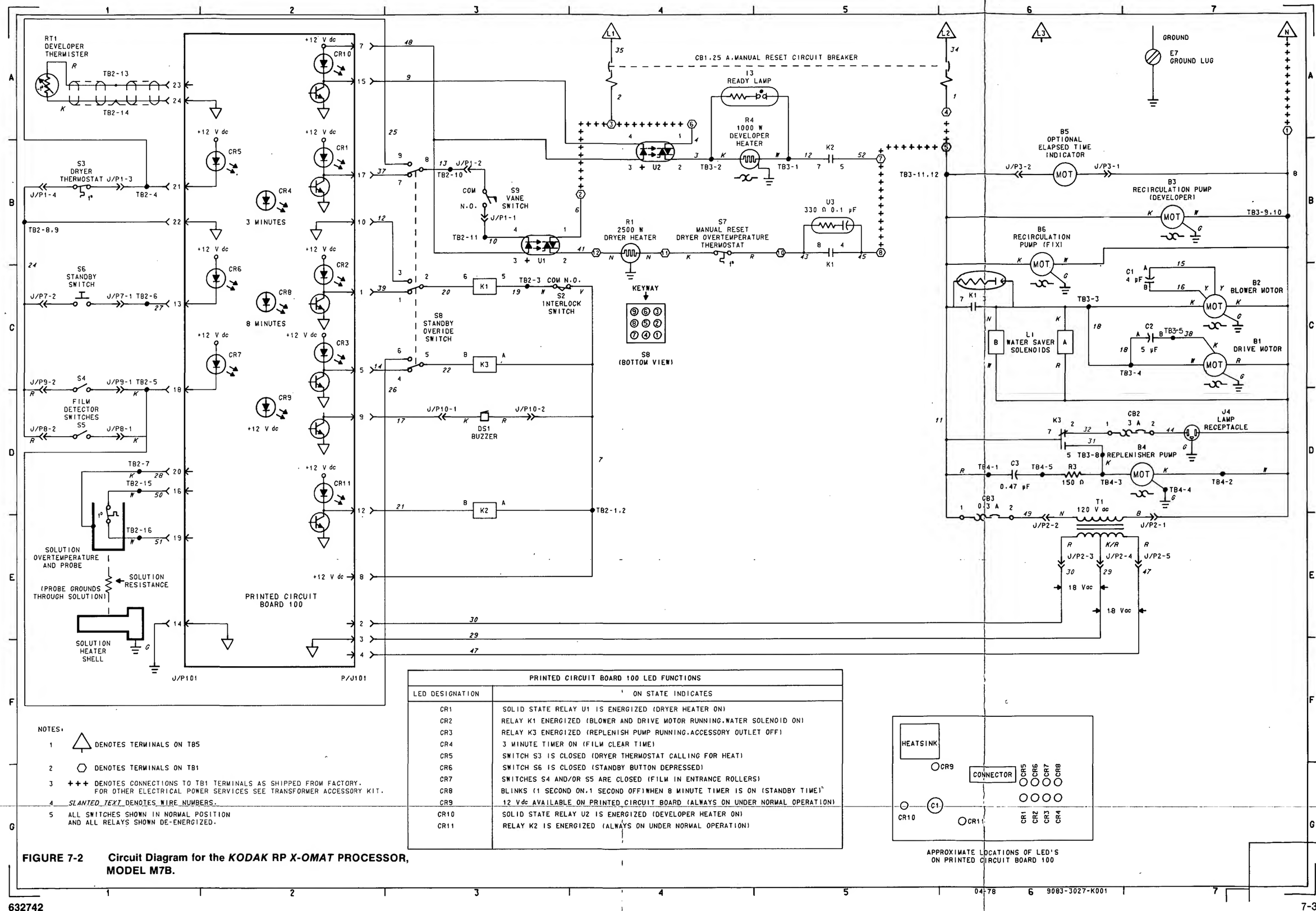


FIGURE 7-1 **Wiring Diagram for the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**



NOTES:

1. △ DENOTES TERMINALS ON TB5
2. ⬡ DENOTES TERMINALS ON TB1
3. +++ DENOTES CONNECTIONS TO TB1 TERMINALS AS SHIPPED FROM FACTORY. FOR OTHER ELECTRICAL POWER SERVICES SEE TRANSFORMER ACCESSORY KIT.
4. *SLANTED TEXT* DENOTES WIRE NUMBERS.
5. ALL SWITCHES SHOWN IN NORMAL POSITION AND ALL RELAYS SHOWN DE-ENERGIZED.

PRINTED CIRCUIT BOARD 100 LED FUNCTIONS	
LED DESIGNATION	ON STATE INDICATES
CR1	SOLID STATE RELAY U1 IS ENERGIZED (DRYER HEATER ON)
CR2	RELAY K1 ENERGIZED (BLOWER AND DRIVE MOTOR RUNNING,WATER SOLENOID ON)
CR3	RELAY K3 ENERGIZED (REPLENISH PUMP RUNNING,ACCESSORY OUTLET OFF)
CR4	3 MINUTE TIMER ON (FILM CLEAR TIME)
CR5	SWITCH S3 IS CLOSED (DRYER THERMOSTAT CALLING FOR HEAT)
CR6	SWITCH S6 IS CLOSED (STANDBY BUTTON DEPRESSED)
CR7	SWITCHES S4 AND/OR S5 ARE CLOSED (FILM IN ENTRANCE ROLLERS)
CR8	BLINKS (1 SECOND ON,1 SECOND OFF)WHEN 8 MINUTE TIMER IS ON (STANDBY TIME)
CR9	12 Vdc AVAILABLE ON PRINTED CIRCUIT BOARD (ALWAYS ON UNDER NORMAL OPERATION)
CR10	SOLID STATE RELAY U2 IS ENERGIZED (DEVELOPER HEATER ON)
CR11	RELAY K2 IS ENERGIZED (ALWAYS ON UNDER NORMAL OPERATION)

APPROXIMATE LOCATIONS OF LED'S ON PRINTED CIRCUIT BOARD 100

FIGURE 7-2 **Circuit Diagram for the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B.**

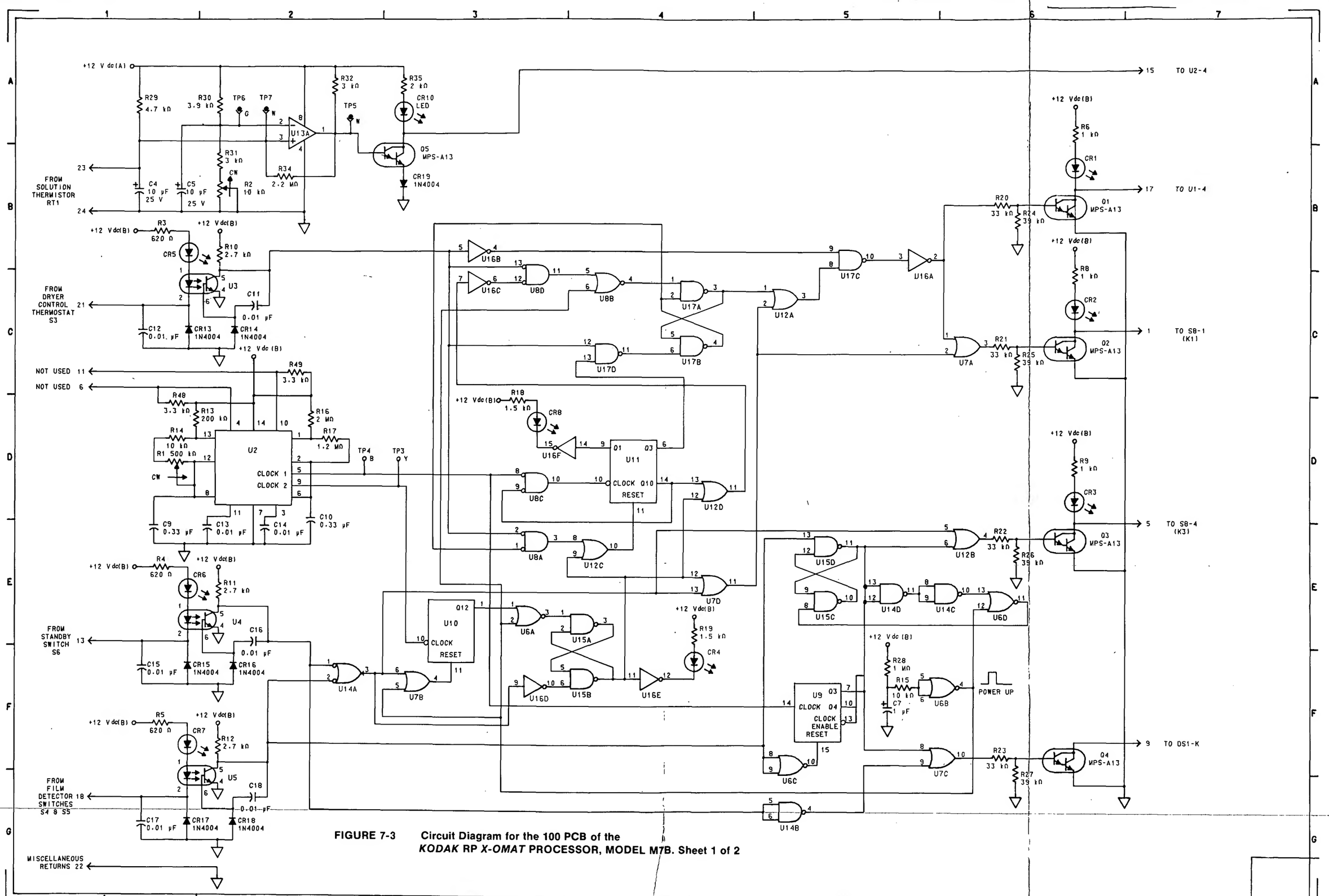
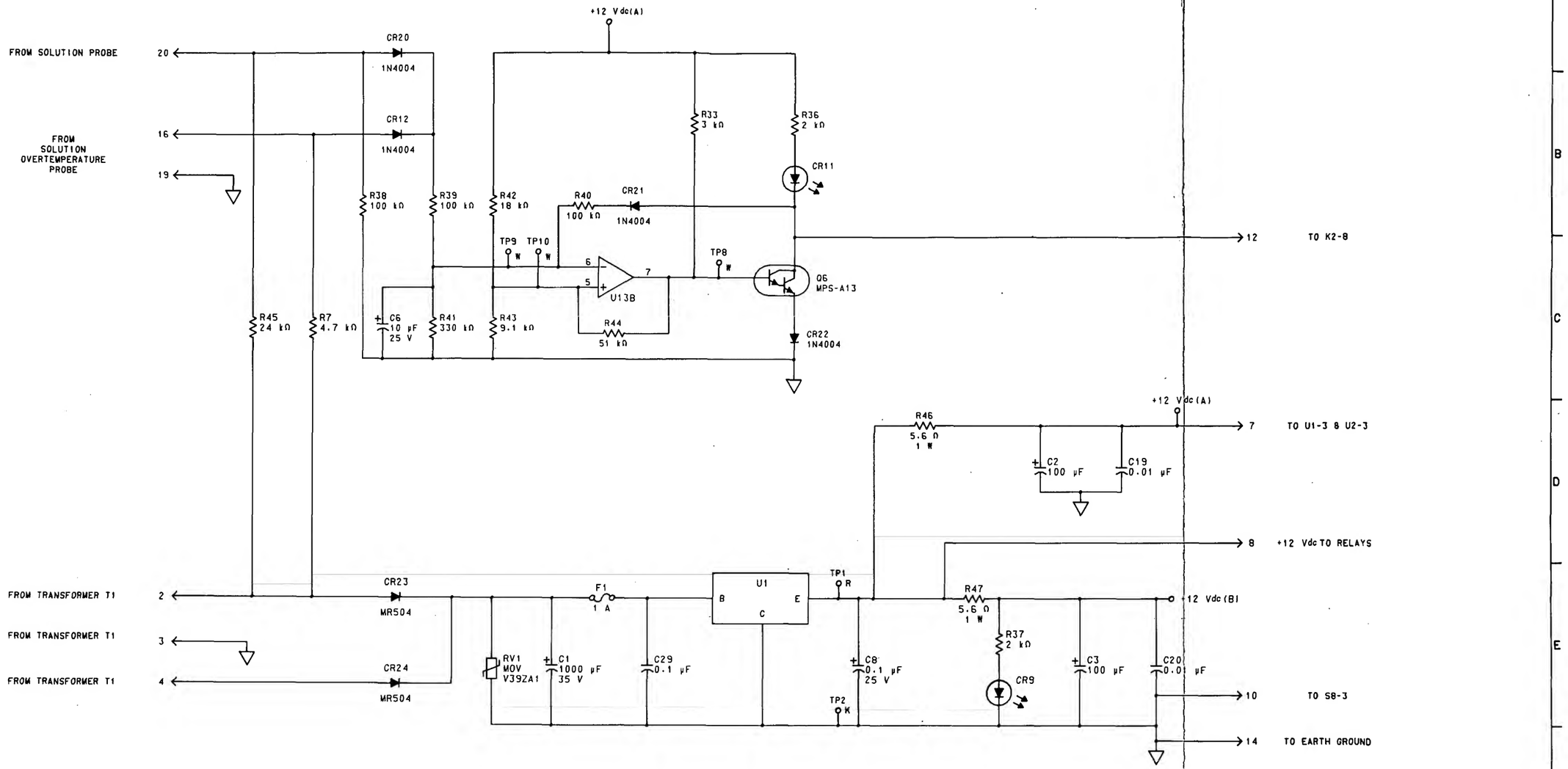


FIGURE 7-3 Circuit Diagram for the 100 PCB of the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B. Sheet 1 of 2



DESIGNATOR	TYPE	Vcc	RETURN
U1	LM340T-12	—	—
U2	NE556	14	7
U3,4,5	SOC-15	—	—
U6,8	CD4001	14	7
U7,12	CD4071	14	7
U9	CD4017	16	8
U10,11	CD4040	16	8
U13	LM393	8	4
U14,15,17	CD4011	14	7
U16	CD4049	1	8

FIGURE 7-4 Circuit Diagram for the 100 PCB of the *KODAK* RP *X-OMAT* PROCESSOR, MODEL M7B. Sheet 2 of 2

Health Sciences
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